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NEWSPAPER

Criminal Systems Hit by N.H., Mass.

State Budget Cuts Erase Funds for Police 'Trace'

By Ronald A. Frank

Of the CW Staff

CONCORD, N.H. — The New Hampshire criminal information network, in operation only since April, is dead. Although the system has already helped to apprehend nine fugitives from justice and helped to recover 18 stolen vehicles, the existing terminals installed at local police departments will be withdrawn "within 30 days" due to lack of funds.

The death knell for the Teleprocessing of Records and Communications for Enforcement (Trace) system sounded when the N.H. legislature pared the new state budget to comply with the economy demands of Gov. Meldrim Thompson.

About \$128,000 was required to keep the system going compared with a state budget totaling \$212.8 million. The money needed for Trace would have allowed operation and expansion of the law enforcement system for

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Governor Doubts Privacy For Records Tied to NCIC

By Marguerite Zientara

Of the CW Staff

BOSTON — Gov. Francis W. Sargent has maintained that Massachusetts will not hook into the National Crime Information Center (NCIC) of the Federal Bureau of Investigation unless "special precautionary steps" are taken "to protect individual rights."

Sargent gave the warning in a letter to U.S. Attorney General Elliot Richardson.

"Recent revelations concerning the Department of Justice, the FBI and top government employees do not inspire confidence," Sargent wrote Richardson.

In 1971, Congress authorized the FBI to give banks and a wide range of state and local agencies access to the national information system.

However, access to the Massachusetts system, supervised by the Criminal History Systems Board, is strictly limited under a 1972 state law to criminal justice agencies or agencies with specific statutory authority to use such records.

As a result of Sargent's decision, a U.S. Attorney is suing Massachusetts claiming that a federal agency takes precedent over state law and should have access to the information in state files regardless of the state law, according to Andrew Cline, Sargent's staff assistant. "They are threatening to withhold \$30 million in Small Business Administration loans and disaster aid because of this," Cline said.

William A. Brown, assistant U.S. attorney, said Defense Investigative Services — a new agency which coordinates several military investigative units — is holding 2,300 cases until it can get into the state files. The cases, he said, involve employment applications or applications for security clearance to work on government projects.

John Shea, acting regional counsel of the Small Business Administration, said SBA credit judgments on \$30 million in loans, bonding guarantees and disaster aid "are somewhat impaired" by lack of access to the files and applications could be

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Preliminary Results Show:

Sharp Operator Key to Dynamic System

By Don Leavitt

Of the CW Staff

DALLAS — Software architecture is critical to optimum use of a system's resources, but throughput on a fully loaded multiprogramming system seems to be affected more by operator skill than by program design, according to Jack Paden, president of Paden Data Systems, who recently completed a study of B3500 sites for Cooperative Users of Burroughs Equipment (Cube).

Input to that study was rather sketchy, he said, but apparently "as a system becomes more fully loaded, we're measuring more the individual operator performance and less the machine performance."

How Important?

The significance of the operator hasn't been quantitatively documented yet, Paden admitted, but was a "gut feel" mentioned by most of the users who took part in the study.

The skill of the operator is perhaps more vital to a completely dynamic machine like the B3500 than to a fixed-partition machine like the IBM 360, he continued, since a 360 can keep going on a couple of partitions even if the operator cannot keep all of them going full tilt.

If an operator gets out of sync with the planned workload on a B3500, resource allocations get all mixed up and

whole systems may be delayed until the expected peripherals, for example, once again become available.

The impact of the human is so strong, he continued, that it seems to rule out any performance measurement not keyed to the individual operator, or averaged over a number of installations with similar configurations and similar workloads. Measurement of a single installation fails to give the user any real standard of comparison, Paden said.

The need to develop better standards of measurement is a user's problem, he told the Cube members, because the alternative — followed by too many installations — is to add to their collection of hardware, or to upgrade their configuration, when the throughput begins to drop off.

The trend toward larger hardware configurations (being used less efficiently)

costs the user money, so it really is his problem and not the hardware vendor's, Paden added, in explaining why Cube and not Burroughs had undertaken this particular study.

The first study Paden did for the Burroughs users, reported at the Cube XXII meeting in Miami, used data from 83 B3500 installations. But the data was probably not complete enough to draw any firm conclusions, he observed, as it covered only information about an "uncontrolled" 14-hour period at each site.

More Orderly Data

To check the tentative findings of the earlier study, Paden and the users are currently collecting performance on a more orderly basis.

The new study requires reporting an entire month rather than a day's activi-

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Some Good, Bad in State DP Review

By Patrick Ward

Of the CW Staff

LEXINGTON, Ky. — Missed programming schedules, programming backlog, poor system/programming documentation and missed production schedules rank as state DP managers' biggest problems, according to the third annual survey by the National Association for State Information Systems (Nasis).

In addition, the report found the states increasingly chose "mixed procurement" (part purchase, usually the CPU, and part lease) when acquiring computer systems. About 70% of new units were leased in 1972, the Nasis report noted, but mixed procurement was up to 18% of installations, compared to 8% of the year before.

"This probably reflects the relative cost-effectiveness of purchasing certain types of equipment and the rapid growth in plug-to-plug compatible peripherals. It is likely to become even more common in the future," according to the report which aims to spread information with the goal of systems transferral among the

states.

By one measure, staff productivity may be increasing: "Hardware costs and personnel costs as percentages of total EDP costs have hardly varied over the past three years," the report noted.

Personnel productivity gains have come from "high-level languages, generalized retrieval systems, increase in professional management, data base management systems, virtual storage capabilities, proprietary programs for assisting programmers' productivity, a variety of improvements in data entry methods and equipment and other developments," the report stated.

But on the other hand, "complexity of systems, sophistication of hardware, and on-line environments are putting increasing pressure on all EDP personnel. Production of 'applications' is generally far more complex and demanding than formerly — from systems design all the way through programming and implementation, including often the need for almost fail-safe real-time systems."

Meanwhile, the DP staffs in the 30 states that reported on staff size in 1971 and 1972 grew, on the average, by a little more than 18% in the year between reports. Five of the states showed a decrease. Since 1970, staff involvement has also changed, according to the report.

"The percentage of personnel engaged in operations has dropped sharply, reflecting consolidation of computer centers, software aids to operators and hardware power. The data entry personnel percentage has increased substantially, resulting from the growing number of applications and comprehensiveness of data bases. The percentage in management has increased as a result of recognition, often long overdue, of the need for improved management of the EDP function. The systems and programming group has not materially changed relatively," the report said.

Outside of the DP department, managers' most serious problems continue, as in 1971, "to concern relationships with

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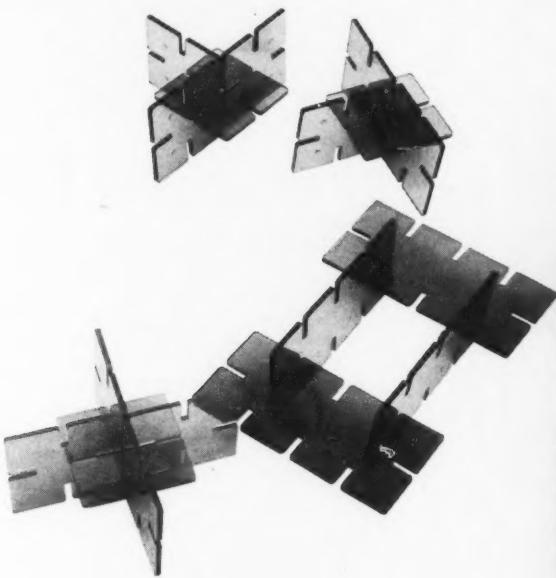
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Cuts in State Budget Erase Funds for N.H.'s 'Trace'

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an additional two years.

The Trace system included federal funds which were provided by the Law Enforcement Assistance Administration (LEAA). The \$128,000 would have equaled 25% of the cost of operating the Trace system through the next two years with LEAA contributing the other 75%.

Short But Sweet

The Trace system in its short life already included a statewide data base with about 4,000 records. Included were 2,500 stolen cars, 1,000 stolen guns, and even "four stolen boats," according to C. Victor Gouger, management information analyst for the N.H. Centralized Data Processing (CDP) agency.

The system used Sanders 804 programmable CRTs and operated on a private phone net into a Honeywell 355 front end in Concord. The 355 operated on a channel of the HIS 6060 at CDP headquarters. The message protocol of Trace was identical to the formats used by the

FBI's National Crime Information Center (NCIC).

The direct link with NCIC in Washington, D.C., meant local N.H. police departments with a Trace terminal could run criminal information checks in seconds. In many cases an officer in a police cruiser was able to run a check on a suspicious vehicle through Trace and get back an answer before stopping the vehicle.

The record check would be relayed by radio to a local dispatcher who would then enter the query into a remote Trace terminal. Local police departments who already had the Trace terminals installed praised this added security for officers in the field.

Before the Trace system began operating, the only direct link with NCIC was at state police headquarters in Concord. This meant local departments had to radio messages into the state police and then wait for often slow replies.

The proposed funding for Trace was part of an on-again, off-again financing

plan that culminated in a reduced budget for the state. The Trace funds were first cut out in the House budget recommendations, restored by the N.H. Senate, and then eliminated again when final budget cuts were made by legislative officials to comply with lower spending limits demanded by Thompson. And although the N.H. Centralized Data Processing agency emerged with an increased total budget compared to the last operating biennium, the Trace funds were not included.

The Trace system was projected as the first phase of a total statewide criminal justice information system that was to have been implemented over a five-year period. Subsequent phases after Trace would have included court records, criminal histories, and correction and probation records. The programmable terminals would have allowed each agency to access only the records to which it had a need to know, Gouger said.

"The loss of this system is going to take away from this department one of the

most important law enforcement tools," is the way one "very disappointed" police chief described the impending loss of his Trace terminal.

"A lot of this [Criminal record check] work cannot be done by radio so we will have to go by telephone," the police chief said. This will mean that record checks on a stolen car will take two to three hours instead of minutes, the chief added.

Mass. Governor Doubts Privacy of Records Tied to FBI's NCIC

(Continued from Page 1)

refused if the agency "followed the letter of the law."

Meanwhile, according to Cline, the U.S. Attorney's office has been denied an injunction in Federal District Court which would have allowed blanket access to the files.

Sargent said the Massachusetts criminal history system "has been designed to provide internal and external safeguards against potential abuse."

Safeguards surrounding the Massachusetts system are:

- Once an agency has gotten information from the file, it cannot pass it on to anyone else, but must keep it confidential.

- The Privacy and Security Council, created by law, is a civil libertarian watchdog agency with complete access to the files; it can represent certain concerns on behalf of citizens.

- An individual has the right to see any information in his record and can correct any information that is wrong or proven wrong or inaccurate.

- The kind of information in the file is restricted to criminal record history information. For example, if someone is charged but found not guilty of a crime, the information is not put into the file.

The federal system has no comparable guidelines for the national criminal history system regarding access or the kind of information which can be put into it, according to Cline. Only nine states, including Massachusetts, have purging requirements on their information files and the other 41 are still feeding out information.

There are no federal controls on the states and the FBI relies on the states themselves to police the system, he said. "Suppose state X has no controls on its file. A Massachusetts agency, denied access by Massachusetts, can go to state X to get the same information which is tied into the national network," he said.

"Richardson's response to Sargent's letter," said Cline, "though he hasn't responded formally, has been good and I think he may set up such a system of regulations."

Sharp Operator Seen Key to Dynamic System

(Continued from Page 1)

ties. And preparation for the study included a detailed definition of the hardware, both CPU and peripherals, used at each site.

User reports are supposed to be sent to Paden by the middle of July and he hopes to have his analysis completed in time for the Cube XXIII meeting, scheduled for Houston later this summer.

The average installation covered in the first study included 150K bytes of core memory, 104M bytes of disk memory, four tape units, a card reader and a line printer. These systems, Paden said, were primarily used in multiprogramming with an average of 2.9 jobs running concurrently during the test period.

The application workload utilized an average of 12.9 hours of "direct" CPU time out of the 24-hour reporting period and the CPUs were idle 10% of the time.

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Grand Jury 'Concerned'

Calif. County At Odds Over Possible Switch to FM

By Marvin Smalheiser

CW West Coast Bureau

SANTA ANA, Calif. — The Orange County supervisors have approved a move toward facilities management (FM) for county data processing amid a controversial decision which has prompted a plea for caution and reconsideration from the grand jury.

A three-man county negotiating team is meeting daily with representatives of Computer Sciences Corp. (CSC) and Electronic Data Systems (EDS) and a report is expected this week.

The supervisors approved by a three to two vote the FM concept after hearing a disputed staff report and deciding against Univac's low bid, which was recommended by the county's Data Services Department (DSD) and a study by Arthur Andersen & Co.

The issue has also touched off a dispute over a blue-ribbon committee's purported views concerning Univac, IBM and facilities management in general.

If the county follows through on the FM recommendation by R. E. Thomas, county chief administrative officer, it would be the first county in the state and the largest in the nation to switch to FM.

Thomas, who also recommended use of IBM rather than Univac equipment for FM, said the move would provide lower costs and upgrade the entire operation with guaranteed performance.

But his report was called inaccurate, a turnaround and at variance with Andersen's study as well as the views of the blue-ribbon committee of computer experts.

Grand Jury 'Concerned'

The grand jury presented a letter to the supervisors after their meeting saying it is "most concerned" over the handling of evaluation and alternatives for data processing.

Robert S. Farmer, director of data services, said Thomas's report contained "many misrepresentations and misinterpretations of fact."

"It is not logical, nor is it in the spirit of free enterprise, to recommend that a competitor (Univac) be excluded from further consideration while a competitor with higher cost is recommended for contract negotiation."

The recommendation to utilize IBM computers, he said, "is in direct conflict

with all studies and evaluations which have been documented on this subject to date."

Farmer, who is president of the California Association of Data Processors, referred to an \$85,000 study by Andersen which evaluated Univac as providing "twice the computer capacity at \$2 million less than the cost to obtain IBM computers sufficient to meet the county's requirements."

Supervisor Ralph A. Diedrich, who voted in favor of facilities management, told *Computerworld* he was motivated by "hard dollar reasoning."

Too Technical

He said the in-house operation was getting "so technical it couldn't get the in-house people necessary to make the operation most economic."

Diedrich said he did not give the Andersen report as much credibility as some

other supervisors.

He favored IBM equipment because while it would cost "a trifle more" there would be savings in system development.

Also, he said, the county would be more apt to find systems it can use for IBM equipment, and "the systems we do write will be more marketable."

Farmer said he had no innate dislike for the facilities management concept and that its value would depend largely on the contract negotiated.

Part of the controversy centered around the blue-ribbon committee of computer experts who met for several months with county officials to discuss the county computer requirements.

Who Wants FM?

Dr. Thomas Penderghast, a Pepperdine University professor on the committee, said that the panel recommended against a switch to FM and did not give IBM

equipment the unqualified endorsement Thomas suggested.

Penderghast, an associate professor in the graduate school of business, said only one person on the committee of experts favored FM.

"We did not get involved in a technical evaluation of one machine over another," he said.

Supervisor David L. Baker, who voted against the FM concept, said he attended the committee meetings and their views were not as reported.

Don Minard, a partner in Arthur Andersen, and Lloyd Seese, Los Angeles manager, who worked on the equipment evaluation, said they considered a number of alternatives in the process of their study.

Minard said the conclusion was that the county should secure the Univac equipment and operate it as an in-house facility.

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Two Models Must Be Run in L.A.

By Joseph Hanlon

Special to Computerworld

LOS ANGELES — New high-rise buildings cannot be built here until computer models show they can resist earthquakes, under a new building code recently introduced here.

Los Angeles is apparently the first U.S. city to require such computer tests as part of the building code.

Before any building more than 160 feet high is built, two computer models must be run. The first assesses the effect of the so-called "design" earthquake — the most serious earthquake considered likely during the life of the building. The computer model must show that the building will retain its structural integrity during the quake.

The second test is of the worst earthquake considered possible in the Los Angeles area — essentially the San Francisco earthquake of 1906. In this more severe earthquake, the building can be significantly damaged, but the computer model must show that the occupants of the building can be protected.

The models must not only consider the structure of the building itself, but also such problems as the size and distance of nearby faults and the nature of underlying bedrock and soil.

The new code was introduced as a result of the 1971 San Fernando earthquake, which destroyed several modern buildings.

Computer models of building motion during an earthquake are now quite good,

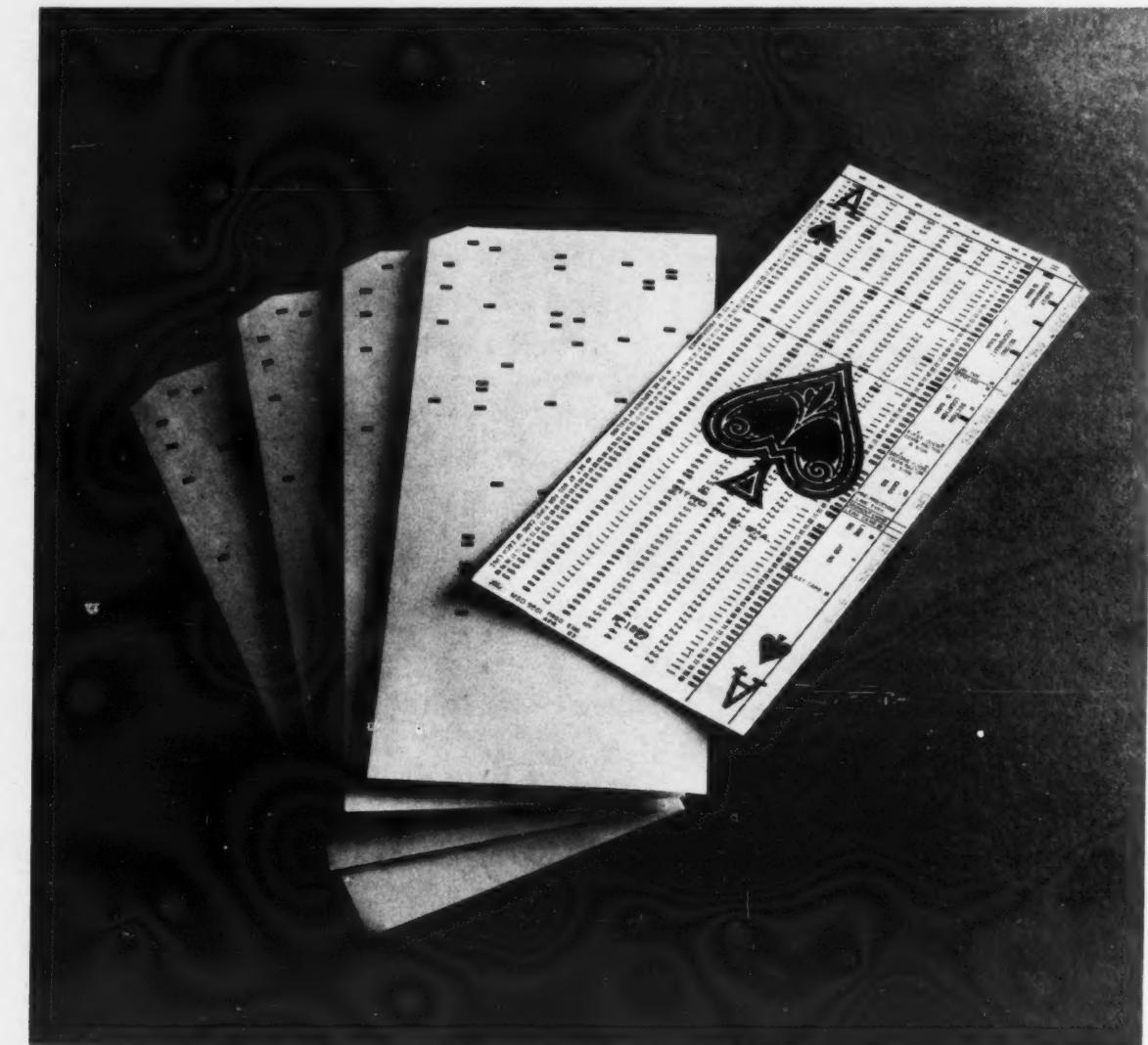
according to David Dowrick, an authority in the field who works for Ove Arup and Partners, London.

He cited the example of a 16-story office block in Los Angeles designed by Japanese architects and owned by the Kajima Building Corp.

It was opened shortly before the San Fernando earthquake and has earthquake recorders in the basement, on the eighth floor and the 16th floor. Using data from the basement recorder (which gives earth movements) during the 1971 quake, the architects were able to use a computer model to accurately predict the movements of the upper floors.

But Dowrick also noted the building in question "is a simple, regular building that we can understand."

Dowrick said that in many cities, building authorities have begun informally requiring computer model tests of earthquake resistance.



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Computer to Analyze

Ala. Court Bottlenecks

By Ken Shonk

Of the CW Staff

MONTGOMERY, Ala. — The National Center for State Courts is using a computer to analyze the case processing in Alabama's courts to isolate the bottlenecks in the handling of appellate cases.

Chief Justice Howell Heflin of the Alabama State Supreme Court requested the study, after expressing concern over the delays in the appellate process.

"There are enough different stages in the processing of an appeal," noted Professor David Halperin, who is coordinating the study, "that to analyze the time factors for the 3,000 cases in the period from October 1970 through September 1972, you have to turn to the computer."

John Wilkerson of the Alabama Department of Court Management said the study should provide an idea of where backlogs in the appellate process are occurring. "We'll then have positive evidence of the bottlenecks and be able to point to the need for corrective action," he added.

"We're using the Statistical Package for Social Sciences that the National Opinion Research Center developed as the basis for the statistical compilations," Bob Byer, the programmer working with Halperin, stated. "The package has been popular with users with IBM installations, but we've converted it to run on the Univac Series 70/7 with the virtual memory our installation has."

Halperin said he has collected all the data on two of the three appeals courts in Alabama and that he feels one of the problems will be the delay in getting the trial court records from the trial courts to the appeals court. "Delays of a year are common," he added.

Animal Parasites Simulated

Special to Computerworld

CANBERRA, Australia — The life cycle of an internal worm parasite of sheep is being simulated by computer as an aid to devising improved measures for parasite control.

The division of computing research of the Australian Commonwealth Scientific and Industrial Research Organization has been collaborating with the division of animal physiology in developing a comprehensive mathematical model of the various stages in the life cycle of a particular internal worm parasite of sheep.

The part of the model concerned with the free-living stages of the life cycle has already been formulated. This part starts from a given time history of deposition of eggs (which will eventually be computed by the rest of the model) and, taking into account day-by-day weather variations and the conditions necessary for development, computes the number of eggs that will hatch each day, the number that will develop to the stage where they can reinfect the animals and the concentration of these infective larvae on the pasture.

Election Results on Tape

NEW YORK — The official election results of New York City are now available on computer tape to public opinion analysts, the news media and other interested individuals.

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As Opposed to 'Real' Situation

Memory Management More Critical in Virtual System

By Don Leavitt

Of the CW Staff

NEW YORK — The effort devoted to memory management is sharply reduced for the programmer working in a virtual memory environment, but the work he still has to do is even more critical to the effective operation of the system than all the work he had to do in a real memory situation, according to Prof. Peter Denning of Purdue University.

Speaking to a meeting of users of Electronics training aids, Denning noted that the efficiency of virtual memory systems depends on two factors.

The effectiveness of the mapping or dynamic address translation function is, of course, based on the vendor's hardware and "generally very effective," he said.

Enter Programmer

But overall efficiency, Denning noted, also depends on the ability of the system

to overlap the handling of transfers of data between main and auxiliary memory with execution of the user's application program, or the ability to minimize the amount of non-overlapped memory I/O operations. This is the area in which the programmer still plays a critical role, he added.

Paging, the mapping approach now most heavily used, has little impact on the execution speed of a program, Denning argued, and would slow processing only 3% compared with execution in a real memory environment with the full amount of main memory required.

Even though the virtual memory programmer need be no longer concerned about planning overlays and other techniques to make the best use of available real memory, he must be even more concerned about the organization of his logic so that mapping overhead is kept to a minimum. He must, the professor said,

be very conscious of the block phases of each program system.

Focus on Interrelationships

It might not be a bad idea, he added, for programmers to set up block phase diagrams to focus on the interrelationship of system resources and program logic. There are ways, he said, of recognizing a "friendly" block phase diagram that will be effective.

The total memory required for any phase must be equal to or less than the real memory available, and program logic should be planned to avoid relocating blocks or pages of logic between phases.

Plan to have pages "active" in as many consecutive phases as possible, he urged, to limit the possibility of paging faults or delays as needed pages are moved from virtual to real memory.

The blocks or pages should be loaded as few times as possible and the user logic

should enable the system to initiate requests for upcoming pages before they are actually needed. In sum, he said, programs should be shaped to have good "locality."

Learning how to work for good locality takes some time, Denning admitted, but pays off handsomely in terms of programming costs. In one experiment, he noted, programmers working in a real memory environment spent about 50% of their coding time controlling overlays.

Logic required for good locality in a virtual memory situation for the same application added only 5% to the programmer's effort.

Virtual memory adds a slight time lag on the execution of programs, but this is more than offset, Denning concluded, by the system's ability to execute jobs in much smaller real memory than they would need otherwise.

Canada Police Net Would Give Access To Each Policeman

OTTAWA, Ont. — Fast, accurate information is the lifeline of efficient police operations, according to Allan Lovlin, the Ontario police commission's director of systems planning, and the new computerized Canadian Police Information Center (CPIC) aims to provide it.

The system, which became operational in July 1972, is for the moment limited to cross-country records of wanted persons and stolen cars. Within a year or two, however, information is expected to be available to any police officer regarding a suspect's criminal record and bail situation.

The officer will be able to determine whether the suspect is wanted by any other Canadian police force or if a suspect's car is stolen or wanted in connection with a crime.

A monthly check is made to ensure that the information on file is accurate, Lovlin explained. The checking system is the same as that of its U.S. counterpart, the National Criminal Information Center; every 28 days the computer prints out all the information it has received in the previous 28 days and the list is sent to each agency that entered information into the system. Each agency corrects any mistakes through its own terminal, he said.

Pattern Recognition Vital to Detection Of Bad Chromosomes

LAFAYETTE, Ind. — How do you tell a good chromosome from a bad one? And there's no punch line!

King-Sun Fu, professor of electrical engineering at Purdue University, and his graduate student assistant have taught a computer to "look at" chromosomes and pick the good from the bad. Every cell has 46 chromosomes, with 44 grouped in pairs and two left over to determine sex. The technique teaches the computer, using a pattern recognition system, to spot the bad chromosomes, which are usually broken into pieces, have holes in them or are circular in shape.

Data about the cells is converted into numbers representing 64 different shades of gray in the cells. The numbers are entered on magnetic tape and the tape is fed into a computer.

Fu explained that his technique may be the only way to uncover small variations "which may prove important in relating chromosomes to diseases."

Scientists associate birth disorders, nearly every case of cancer and more than a third of all miscarriages with abnormal cells.

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This warranty pertains only to the original buyer and is not transferable. When leased Mark X/L disc packs are subsequently purchased, the effective warranty period commences on the date the pack was shipped to the lessee.

The liability of Memorex Corporation under this warranty is limited solely to replacing, repairing or issuing credit, at its discretion, for the products that are defective and in no event shall Memorex Corporation be liable for any other damages, including incidental and consequential damages. The warranty expressed herein is in lieu of all other warranties, express or implied, and no other affirmation of fact or promise made by Memorex by word or action shall constitute a warranty.

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Editorial**Getting Down to Business**

The United States Constitution guarantees defendants the right of a speedy trial, but apparently in the government's antitrust case against IBM, the defendant — as well as the prosecutor and judge — is not seeking a speedy resolution of the issues.

It is time Judge Edelstein took the case in hand and required both IBM and the government to get down to the business of trying the case.

In this case, the consumer should be assured of some speed since the future of many computer using organizations hinges on the outcome.

But there has been no attempt to get the case to trial even though it has been four-and-a-half years since it was filed — too long a time for one of the most important antitrust actions in the nation's history.

All three parties to the case are guilty for this unwarranted delay — IBM for its motions that deny needed documents to the government and tie up government manpower in sideshows; the Justice Department for not devoting sufficient manpower to the effort; and the courts for not forcing the parties to prepare expeditiously.

IBM has accused the government of document destruction on what the government contends is pretty flimsy evidence. But whoever is right on the issue, its mere existence has caused the Justice Department to halt all of its work in preparing for the trial and concentrate on the side issue.

Over a month has been lost.

On the other side, armed with a favorable Supreme Court ruling, the Justice Department has demanded certain documents from IBM. IBM says it will accept a light contempt citation rather than reveal the documents.

For over 14 months the government has been denied these documents because of IBM appeals on the issue — and a great deal more delay appears ahead.

But the Justice Department is equally guilty. Faced with one of the most complex cases in history — one that could change antitrust law forever — it has consistently failed to devote adequate resources to the case.

For well over three years, very few attorneys were assigned to it and little money was spent to prepare for it. No wonder the government claims it is now unprepared for a trial — a situation that can only be called shocking.

Judge Edelstein is also guilty of allowing too much delay in the case. Several months ago he reserved decision on an IBM motion that would have called for a trial on the market definition issue within 30 days. While we disagree with that motion for several reasons, he certainly has had time to rule on it.

And just recently he failed to make a decision either on the document destruction issue or on finding IBM in contempt for its failure to produce records. Will it take him another six months before he will rule on these two issues?

Judge Edelstein assigned himself to the case even though he has one of the heaviest workloads of any judge in New York and despite the fact that he is hearing several other important cases at the same time.

But the IBM case is too important to be relegated to the sidelines. Even though it might temporarily serve to delay the case now, Judge Edelstein should consider appointing someone else to the case if he cannot find the necessary time to devote to it. Better yet, he should reassign some of the other cases now before him to other members of the judiciary so that the IBM case can be started.

The judge should immediately set a trial date — preferably by the fifth anniversary of the filing of the case which is next Jan. 1.

If nothing is done soon to speed up the case, it could drag on for years. It would be criminal if that was allowed to happen.

It's Your 24 Hours**Self-Management Saves Time**

If you are always short of time, maybe you manage yourself badly.

We all share the same 24 hours every day. This time is your chief asset, so how you spend it determines your success over the long pull.

Review how you spend your time at work. The telephone, meeting and junk mail steal a lot of your day. But, socializing, firefighting, procrastination and lack of plans also rob you of your time.

You will probably conclude that your main problem is yourself. Therefore, to increase your output per day, you have to improve your techniques of self-management.

Deep Thinker

Lack of planning costs a lot of time! It is more fun to fight fires, but others should probably handle most daily problems while you concentrate on planning. Investing your time now in planning can save much more time later.

Ideally, you should have a rolling five-year plan hammered out jointly by computer center people, executives in your user offices and your management.

A good format is to define enduring, general objectives, to identify specific goals (e.g., software, or applications), to develop strategies (i.e., user, budget and management strategies) and to develop annual operating plans.

Such planning "buys" you lead time to meet future events, provides standards for control and supplies you with a basis for your current decisions. Without

such planning, you will probably waste your time on daily problems and on matters with little long-term significance.

When you have set your priorities by careful planning, focus on one problem at a time. R. Alec Mackenzie retells the famous story about Charles Schwab, president of Bethlehem Steel, who asked the consultant, Ivy Lee, how to get more done — in his book, *The Time Trap* (N.Y., American Management Association, 1972).

Lee said to write down tomorrow's tasks and to number them by importance. Start working on number one and stay with it until it's completed. Then recheck your priorities and start on the next job, sticking to it until it is done. Schwab got so much help from this, he sent Lee a check for \$25,000.

Procrastination

Procrastination can also be a time waster. This pattern of stalling apparently starts very young when a child wants to placate authorities (mother, teacher, etc.) while concurrently wanting to rebel. People who are constantly late are probably procrastinators; late to work, late to meetings and late with reports is their normal routine. This can hold up other people, wasting much time.

Poor use of delegation can waste your time. Confusion and indecision occur when you and your subordinates have not agreed on who does what.

Decisions should be made at the lowest level where a person can reasonably be expected to have the required knowledge. This allows you to depend on their good judgment for daily matters so you are free to concentrate on planning. If, instead, you decide everything yourself, papers will pile up on your desk and important decisions will be delayed because you do not

delegate your authority. You should insist that subordinates solve their own problems. If you don't, you will be controlled by subordinates who want you to do their jobs.

Accent the Positive

Your attitudes may waste your time. Spending your time defending yourself and criticizing others is wasteful, draining your energy with these negative activities, thereby decreasing your output. Devoting yourself to positive pursuits will probably be much more productive in the long run.

If you are always short of time, maybe you need to refine your self-management techniques. But it can get confusing.

Problems Pop Up

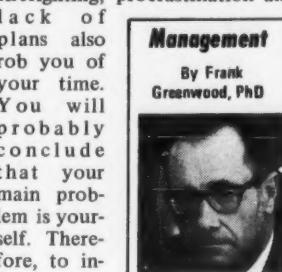
Over next weekend you may resolve to let others make decisions and to rely on them for day-to-day problems, so you can concentrate on long-run matters. Then, Monday morning the software blows (there goes the payroll schedule). At noon the modems for the remote terminals fail (and the nearest parts are 800 miles away).

At three, the vendor's maintenance man mentions that the new printer will cost an extra (unbudgeted) \$550/mo to maintain. At quitting time a customer who has been getting lots of (free) help complains about your service.

Nevertheless, the higher you climb, the more help you have and the less reason to be short of time. You may need better planning, or improved delegation, or clearer definition of priorities. Perhaps you need to control your procrastination more.

It is your time you are spending. To master your time, you need first to master yourself.

(Frank Greenwood is director of the University of Montana Computer Center.)

**Deep Thinker**

Lack of planning costs a lot of time! It is more fun to fight fires, but others should probably handle most daily problems while you concentrate on planning. Investing your time now in planning can save much more time later.

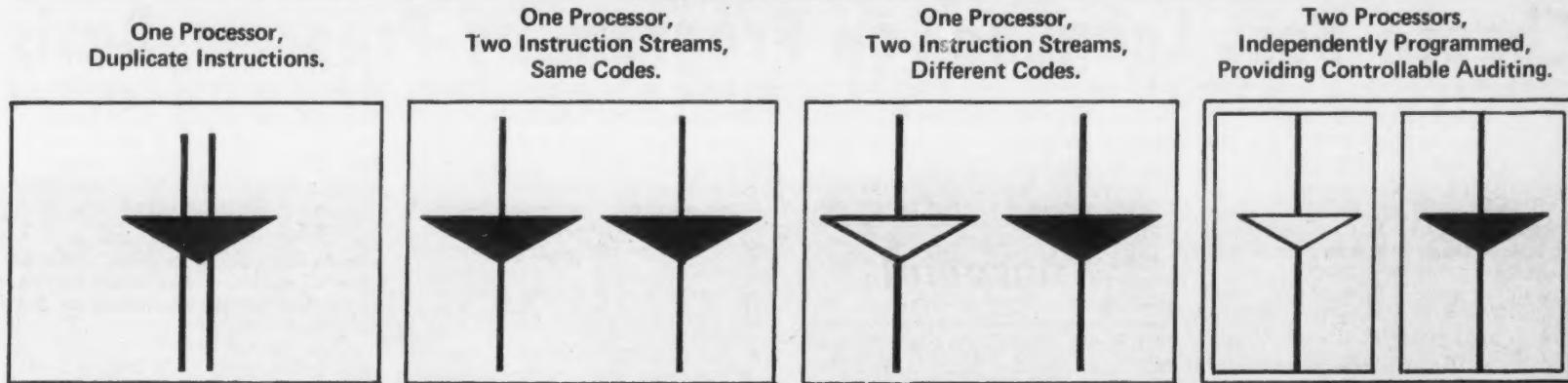
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Such planning "buys" you lead time to meet future events, provides standards for control and supplies you with a basis for your current decisions. Without



'He Won't Bite...Fill'er Up!'



Univac gained arithmetic reliability from duplicate instruction streams.

Burroughs 5000 gained system uptime when reliability was dubious.

Control Data 6600 gained efficient handling of two types of function tasks.

System of future will gain management and auditing control by using its second instruction sequence to provide an audit trail.

In the Immediate Future

Two Instruction Streams Can Enhance Auditability

Auditing computers and computer output is hard. Traditionally it has been accepted as being practically impossible because the computer programmer was the only person who could understand exactly what was going on in the program — or he was the only person who bothered to understand it.

A programmer included all the controls he was asked to put in, but did not normally include very many controls to permit either the programming, or the operation of the program, to be actively managed or audited.

The reason for permitting this modus vivendi (a practical arrangement that bypasses difficulties) to continue in such an uncontrollable manner — so it was

said — was economics. It was simply too expensive to put in new control programming, to train new control programmers, and then to integrate the functional and control operations. Such integration was said to be beyond the state of the art — and who can fight that limitation?

We, accordingly, have developed a basically irresponsible type of programming which has led, in turn, to the finger-pointing of the computer as the cause of the multimillion dollar Equity Funding scandal.

There is, however, a technique of computer architecture, **two Instruction Streams**, which can provide properly managed and controlled programs.

A Publication Albatross Hangs Around ACM's Neck

By Joseph T. Rigo

Special to Computerworld

Eric Weiss is a remarkable human being. He is intellectually brilliant. He is an enormously effective administrator.

Weiss has just completed a term as head of ACM's publications board. As such, he was responsible for all of ACM's national publications.

He found technical editors and referees, planned budgets and finances, and generally made sure that the highest standards of operation were attained.

ACM's publications have long been a puzzle to many people. Weiss cleared up the puzzle during one of the ACM meetings at the NCC in New York.

The publications, he said, exist for the authors.

On campuses these days, professors must publish or perish, Weiss noted. Their promotions and pay raises depend upon their getting their research papers accepted by professionally prestigious magazines. ACM's role, he said, has been to provide publications for this purpose.

That is, it does not matter whether the articles are of any interest to large segments of the ACM membership.

It does not matter whether they discuss matters of current concern to data processing.

It doesn't even matter that many of them are more than a year old by the time they appear in print.

To put it another way, applications programmers, systems analysts, and data processing managers who join ACM for professional development are subsidizing these publications with their dues money.

In return, they get to receive magazines filled with articles that are never intended to be of any value to them.

Let there be no doubt. This is not simply my personal opinion. This is a matter of ACM policy, unwritten, but clearly stated and defended by ACM's top officers during the NCC meetings. And

Weiss's replacement as head of the publications board, John Gosden, says he fully agrees with it.

It is reasonable to state that ACM actively solicits memberships outside the academic community.

Its advertisements appear in many data processing publications. Its officers actively encourage non-academics to join.

The national association, nevertheless, refuses to serve the non-academic portion of its membership. One of its few services — the professional development program — was cancelled at the June Council meeting. (For the record, let it be noted that I was to be one of next year's traveling educators. If this destroys my credibility, so be it.)

Another membership service — the lectureship program — was drastically cut back. This program sent speakers to chapters throughout the country with costs paid by the national organization.

The publications are sacred. All sorts of services may be eliminated. The membership attrition rate may be horrendous. But the research papers — and nothing else — must appear.

The problem is that data processing really needs a major professional association that is not tied to any manufacturer.

Our applications programmers, systems analysts, and managers are in a mess. They can't all belong to Guide or Share.

It doesn't matter whether they work for companies, universities, or government.

We need a mechanism for exchanging ideas, meeting fellow professionals, and generally keeping up to date. We need the services that can be provided only by a professional association that covers all aspects of data processing.

We could break away from ACM and organize still another association. But that doesn't make sense. A perfectly good vehicle already exists in ACM. The problem is how to make it work.

Two instruction stream techniques do not even need outsiders involved in the problems that are the skilled programmer's bailiwick.

Dual Streams

The two-instruction-stream concept in itself was an evolution from the original Univac concept of having two processors operating on the same programs and same data. The results were then compared on an instruction-by-instruction basis with the Univac system to improve arithmetic reliability.

Later developments of the system were pioneered in the Burroughs 5000 and the CDC 6600 families of processors. In the Burroughs 5000 and later developments of this system, the two streams were identical as far as instruction codes were concerned. The streams were used to power two identical processors with the capability of switching control between them, but each CPU worked on different programs.

In this way the Burroughs Master Control programs could continue on the air using one processor both as a slave-processor as long as matters were going well, and as the all-important immediate backup processor in case of engineering difficulty.

As a necessary part of attaining this reliability the Burroughs System also had the first real operating system (Master Control Program) and was able to connect its peripherals to either of the two computers. The concept survives in the newer Burroughs systems and provides multiprocessing and interchangeability of system resources.

After the success of the two-instruction-stream process in the Burroughs system early in the 1960s, Control Data introduced a variation of it in its 6600 series. The CDC variation was to design the two streams of instructions with different machine instruction codes; not just the same ones as had been the case in both Univac and Burroughs.

In the 6600, there was one set of codes for main line processing in the CPU itself, and a second set of machine codes used for the "peripheral processors."

This second, but different, set of machine codes was organized for handling rather than processing data, managing the input and the output, and, interestingly enough, was also used to control the whole execution of instructions.

The basic poor balance between the very fast central processor and the slower peripherals was able to be ameliorated in this way, while leaving the number crunching codes very simple (and therefore, improving the ease of checking pro-

grams). This system also used a control program which was normally written in the peripheral code.

Still, at this time, the use of both machine sequences was restricted to the main programmer. And the cost of that second instruction stream was high. Too high a cost to waste by giving away as an auditor-type control.

\$2,000 Stream Cost

Now this cost restriction is no longer necessary. About a month ago a firm called Control Logic, Inc., in Natick, Mass., introduced a "Do-It-Yourself" minicomputer based upon a central processor on a chip.

Control Logic provides the interfacing capability, which can relate the processor to a standard type interface — such as the teletypewriter interface. The firm provides for memory, for secret programs to be burnt into instruction sets, and generally for doing whatever the auditor's need is — through a minicomputer.

Economically the system is much cheaper than either the second Burroughs 5000 instruction stream or the second Control Data 6600 one. In fact, the cost of the entire hardware is around \$2,000.

This reduction in price has brought a new concept to practical possibility. The second instruction stream can be used for control purposes without interfering with the operations of the productive programmer.

This type of system will be able to use its second instruction-sequence to control the operations of the computer by providing an audit trail. The main functional programmer will have no knowledge of the auditor's instruction sequence, except to know that it does not interfere with his functional programs.

True, there are certain apparent disadvantages. The \$2,000 figure does not cover any peripheral equipment, although peripherals are available. But then with controllable encryption no peripherals are needed. The data rate of the system — which uses 8-bit binary words — is not great, somewhere in the 10 kbit to 20 kbit area, depending upon processing.

But then, by skillfully designing the control stream it is quite possible that this will suffice.

Even with these difficulties, it has become clear that if the Control Logic "Do-It-Yourself" minicomputer can be made to act as an independent auditor's processor, we may be able to handle more control mechanisms than we currently do.

And if this is so, it looks as though we might have an answer on how to avoid future Equity Funding fiascoes.

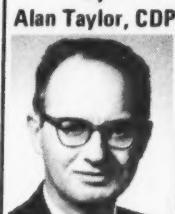
And that is certainly important.

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The Taylor Report

By

Alan Taylor, CDP



Choose Best Language on Program-by-Program Basis

By Jim Frank

Special to Computerworld

I have been reading articles in *Computerworld* that were either for RPG and against Cobol or for Cobol and against RPG. Some letter writers have described results disguised as objective benchmarks or tests of the actual capabilities of each language.

In all the articles I have seen the writer took a single existing program in RPG (or Cobol) and tried to write an effective Cobol (or RPG) program using the same file structure and even, in some cases, the same logic.

Different Capabilities

The fallacy with these types of tests is that if one were writing a complete system in Cobol, the file structure, the program logic and even the number and types of programs would be different than in RPG. The two languages have different capabilities.

If one were writing a print program that has totals at different breaks in a control

field, a Cobol program probably cannot be written that will come close to an RPG program in coding, core or execution time on most machines.

On the other hand, if the program reads through two or three files to get some

Viewpoint

information and then reprocesses the same files doing extensive calculations and prints a list of some kind, Cobol will probably beat RPG.

No 'Best'

The point is, there are applications in which RPG is better than Cobol and Cobol better than RPG, but one cannot categorically say from tests such as the ones I have been reading that one of the two is the "best."

If systems can be written in both languages (and users should insist on a high level of compatibility), then one should

structure files to maximize the benefits of both languages. The best language could be chosen on a program-by-program basis, depending on the application and the capabilities of each language.

If two languages must be benchmarked, then an application should be picked that will be complex enough to include both languages' capabilities. The same program logic should not necessarily be used because this may handicap one of the two languages.

If the same file structure is used for both programs, then at least it should be

noted that the file structure could have been different for more effectiveness of one of the languages. It should also be noted that a test on only one application is a very poor sample to objectively come to a logical conclusion on which language is "best."

As professionals in data processing, we must be more scientific about the tests we conduct and the conclusions we draw from them.

Jim Frank is a systems analyst with Hecla Mining Co. in Wallace, Idaho.

It's 1985 and IBM 'Concedes'...

By Bill Neugent

Special to Computerworld

In the June 13 issue of *Computerworld* on Page 43, Dan McGurk, president of the Computer Industry Association (CIA), predicted that any restructuring of the computer industry that could come out of the government's antitrust suit

against IBM would probably not come about for 10 to 15 years, if the case goes to trial at all.

I would like to commend him for his excellent prognosis, the time frame of which meshes perfectly with my own prediction, which can be illustrated by envisioning a future CW headline:

June, 1985

Justice, IBM Reach Accord

Uncle Sam Cries "Uncle"

After 16 years the Justice Department and IBM have finally come to terms in their landmark antitrust struggle. Although unofficial sources had hinted at such an accord, the exact terms were unknown until today's official announcement by the jubilant three-man Justice task force. Settlement results are as follows:

- IBM will promise to try not to use its overwhelming market advantage to edge out its

Viewpoint

remaining competitors, The Tierra Del Fuego Fire Department, Horsemeat Gravy and Computer Manufacturing Corp. (with 0% of the market to IBM's 100%).

- IBM agrees to reimburse the Justice Department for its expenditures in the case, an estimated total of \$18,700, most of which was expended in a futile effort to automate the massive document data base on an old RCA Spectra 69 Massive Document Data Base Automater which proved to be incompatible with the IBM wall outlet.

- IBM will provide free managerial training for government executives at any of its recently purchased 3,700 MacDonald's hamburger outlets.

- IBM agrees to postpone announced plans of its recently acquired Exxon company to nationalize Russia.

- IBM agrees to stay out of the field of U.S. politics for five years. U.S. attorneys view this as a key concession, providing a clear opportunity for government loyalists to establish a power base.

- A special committee will be appointed to oversee violations of the agreement.

"This should provide a stern example of what can happen when a company attempts to use unfair market advantages to force out competition. Let this be a lesson to those companies which have shown an interest in following in IBM's footsteps," smiled the President of the U.S., Frank Cary.

Bill Neugent is with Associate Planning Research Corp. in McLean, Va.

DP Puts Personal Touch On Children's Storybooks

NORTH HOLLYWOOD, Calif. — The computer, so often associated with de-personalization, has been used to produce something which is the ultimate in the personal touch.

Me-Books Publishing Co., using an IBM 360/65, has printed copies of a children's story, "My Friendly Giraffe," which are completely personalized starting with the book plate which says "this book was written especially for [the child's name] with love and kisses from [the donor's name]." The text incorporates the child's name, his address, the names of his brother or sister or friends and pets.

Sue Schrager, reading teacher at Clark Junior High School in La Crescenta and a consultant for the project, said that experimental use of the book has shown that mediocre readers do as well as excellent readers with the personalized book.

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SOFTWARE & SERVICES

Data Base Users Must Face Hazards, Roark Cautions

By Don Leavitt
Of the CW Staff

NEW YORK — Despite much interest in the positive benefits of using generalized data base management systems (DBMSs), there is, according to Mayford Roark, vice-president of the American Management Association, a growing awareness of a list of hazards in which the uninitiated user or DP manager can become trapped. These systems really form "a new and

complex art," he said, with few large installations and very little documented experience. Part of the problem lies in the fact that there is little portability of the available systems, except within CPUs from a single vendor.

At Ford Motor Co. where he is systems manager, Roark said there are as many as six separate DBMSs, including two from hardware vendors, two from software houses and two that were "home-grown."

Shop Around

They all seem to be satisfying user needs in the various departments or divisions, but the sheer number of systems indicates one of management's problems: how to pick the best one for particular needs.

There are other problems, he continued, such as confused or conflicting objectives for the systems, the physical — hardware — environment in which they are to operate and the approach to the "launching" of the system.

But managers also have to be aware of the problems of tuning the system to the working environment, and of how they will cope with a possible disaster.

Any software system imposes overhead on the operating system and preexisting workload and this has to be taken into account before a system is installed, Roark added.

Similarly, he said, the overhead costs of training or retraining people to work with the new system must be at least estimated before any intelligent selection can be made.

Duplication Always Bad?

The problem of confused objectives arises partly from cliches that have become popular when discussing DBMSs. Much has been said of eliminating re-

dundant data, but, he asked, is duplication always bad? Aren't there times when it makes sense to store the same facts in two or more places?

The "launch" hazards revolve around whether the DP manager decides to get involved with the DBMS in "one great leap, or a series of steps," Roark said.

Tuning a system after it is in may leave a manager wondering what he really has accomplished, Roark said. He noted, for example, that in one case an untuned data base system increased run time by 1000% compared with the previous system.

Other reports indicated that tuning can cut run time 80% to 83%. There are various tools, usually tied to particular systems, to help with the tuning and these "certainly should be used," he said.

Disasters are tougher to cope with in a data base environment than with conventional files, Roark said, but again, there are ways of handling the job.

It is imperative that users provide checkpoints and segmentation, that they control input and consider use of some of the proprietary aids available to dump files to tape for later recovery, if needed.

Simplify, Simplify!

The key to protection against disaster, he said, is simplicity; avoid the complexity caused by application systems that depend on each other.

DBMSs typically do require more hardware — memory may be up 75K to 300K bytes for control software, and file overhead of 5% to 25% is common.

The people involved in support of data bases must be trained for "a new way of life" and this will require a real commitment on the part of the user. There is a more serious need for backup personnel when all the data is under control of a central system, and the role of the data base administrator would be "hard to overestimate."

Random Notes

'Easyout' Runs Under DOS, Gains Conditional Logic

COLLEGE STATION, Texas — The Easyout report writer [CW, Oct. 11] has been adapted by its developer, McKinney & Associates, to operate in either OS or DOS environments. In addition, the logic support has been extended to include conditional branching among the specification statements. To aid in debugging, the diagnostics have been greatly improved, the company added.

The processor is now available for a two-month trial period for \$25, which will apply to the \$750 purchase price if the user wishes to continue with Easyout once the trial is over. McKinney & Associates is at 1213 Neal Pickett, 77840.

School System on T/S Network Tailored to Using District

PHILADELPHIA — Public school districts can perform pupil/personnel management and business office decision-making functions, and provide students and teachers with terminal time under the Education Administration System (EAS) developed by Trilog Associates, Inc.

Installed on a commercial time-sharing net, EAS is tailored to each district but may include scheduling, grade and attendance reporting, personality inventories, financial systems, curriculum planning and budgeting. Cost of the service depends on features required and period of the contract, Trilog said from 1700 Market St., 19103.

Letters Generated After Hours On Word/One Time-Sharing Plan

NEW YORK — "Personalized" letters are generated overnight, after name/address lists and basic texts are entered during the day, under an "off-line" production plan now available on Word/One time-sharing service of Bowne Time Sharing, Inc.

All the sorting, checking and selecting capabilities of Word/One's previously introduced on-line name/address system are available under the new service, but at much lower cost since processing is done in off-peak hours, a spokesman noted from 345 Hudson St., 10014.

But managers also have to be aware of the problems of tuning the system to the working environment, and of how they will cope with a possible disaster.

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Good, Bad Use of DP Resources Pinpointed by 'Comis' Packages

problems, for user department and operating management consideration.

CRT Displays

Those packages are generally comparable to others previously available. Cops, on the other hand, provides dynamic on-line CRT displays of job activity and resource usage in four areas: current activity, backlog, tape and disk usage.

Survey measures system performance at 20-second sampling intervals and reports on utilization averaged over 15-minute periods.

Unlike some other monitoring systems, Survey's accumulated data can be reported at any time, through a call to the companion Report program.

Go-Pac builds its own data base and works with both IBM's System Measurement Facility (SMF) and the user's application programs to account for usage of various resources by individual job in a consistent and repeatable manner, GDS explained.

Survey runs on a 360 or 370 supported by OS/MVT, SMF and Fortran. Minimum core requirements of 8K bytes can monitor up to 128 tape or disk units, 12K bytes will watch over 512 devices and "additional capacities can easily be accommodated," GDS noted. The package is available under perpetual license for \$5,000.

Go-Pac requires one Type 1 SVC, SMF and 1,000 (or fewer) bytes, and is licensed for \$13,500, which includes maintenance for the first year. Support after that will be available for \$250/mo. Cope can be licensed for \$9,500, plus \$95/mo for maintenance after the first year. Grumman is at 1111 Stewart Ave., 11714.

UCC Adds OS Restart, IMS Help

DALLAS — DP operations are provided with support in two separate areas through the use of new software from University Computing Co. (UCC).

UCC Ten is a data dictionary-and-manager package designed to perform definition and control functions for IMS-based installations.

UCC Fifteen, by contrast, is a restart management system that eases the problems of OS shops in preparing jobs for restart once they have failed. It selects the proper job step for the restart and eliminates all incorrect data sets that are to be recreated.

'Inevitable' Failures

Hardware, system, job, line, power and program failures are all "inevitable," UCC said, and because of the limitations of unsupported OS, it is difficult to restart jobs on any step but the first.

UCC Fifteen makes no changes in IBM's OS coding but performs a series of clerical steps prior to beginning reexecu-

tion at the proper job step.

These jobs would normally require hours of work by programmers and operations people, but UCC Fifteen does the job in one second, UCC claimed.

UCC Fifteen requires a data set to hold job step information. The package uses less core than the first job step of any job and can be purchased for \$5,000. Lease plans are also available.

UCC Ten supports IMS by managing and controlling data definitions through information maintained on a central file.

As a manager, UCC Ten can generate control statements, enforce standards, create both test and production definitions of data and assist in data base design.

On-line operation of the UCC package requires a 50K IMS message-processing region. The batch mode requires 100K of core in addition to normal DL/I requirements. UCC Ten costs \$15,000.

UCC is at 7200 Stemmons Freeway, P.O. Box 47911, 75247.

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English 1110s Get RTOS

LONDON — Univac's London Development Center has completed work on a Real Time Operating System (RTOS) described as a streamlined version of Exec 8.

Intended for high-volume, 24-hour operational, transaction-driven processing, the software is now available here, but a spokesman in Blue Bell, Pa., said he was unaware of any current plans to release it in the U.S.

RTOS utilizes the Exec 8 language processors and a subset of the system's Job Control Language. The executive controller has been completely rewritten, however, to handle high-transaction rates, continuous operation of concurrent on-line and batch processing.

Languages available under RTOS include the Navy Electronics Laboratory International Algorithmic Compiler (Neliac), developed by the U.S. Navy.

RTOS can be used on 1110 configurations with as little as one command/arithmetic unit and one I/O access unit — the 1 x 1 version — with 32K words of main memory and 131K words of extended memory.

COS-300 Gains Multi-User Foreground

MAYNARD, Mass. — DEC has sharply extended the capabilities of the PDP-8 based Datasystem 300 running under the Commercial Operating System (COS-300) to include simultaneous multi-user data entry and inquiry operations concurrent with batch execution of an application program.

New software, developed for use with two of the Datasystem 300 models — the 330 or the 340 — allows a program to run in the background, while as many as three terminals are being used in the foreground to gather data for later processing or to answer simple queries.

Each of these foreground, CRT-oriented terminals may be doing a different job, DEC said, and these jobs may change over time since the units need not be dedicated to specific tasks. Currently, however, the software does not allow sharing of files between the foreground terminals or between foreground and background. Therefore, users may tend to keep certain jobs at certain terminals, DEC added.

Stored Formats

The user-written control programs for data entry operations are directly comparable to software used in other shared pro-

cessor key-disk data entry systems.

They project stored formats on the operators' CRT screens, tend to coach them through what has to be entered and validate the data before storing it on disk.

The inquiry support allows the foreground terminal user to update or interrogate existing files for predefined conditions, or to retrieve a record, display it, change any existing field in the record and write it back in the same position.

The new software is currently available from DEC for \$1,000.

Named Data Sets Dumped by 'DSF'

CLIFTON, N.J. — OS/360 users can selectively dump individual data sets from 2314 or 3330 files to tape, or restore them to disk, with the Data Set Functions (DSF) program, now available from Innovation Data Processing for use in connection with the company's Fast Dump Restore (FDR) utility.

FDR is faster than comparable IBM software, the company said, and DSF cuts maintenance overhead time even more, since with it an entire file need not be copied if only certain data sets are worth protecting anyway.

Security Value

DSF may have a security value as well, Innovation added, since several selected data sets might fit on a single reel of tape whereas an entire disk pack, particularly from a 3330 unit, is likely to require several reels. One critical tape can in many cases, be protected more easily than multiple reels.

DSF may be purchased for \$800, but can only be installed on a CPU which has Innovation's FDR software. That is available for \$1,190, so a complete implementation of DSF costs \$1,990.

Innovation is at Clifton Executive Plaza II, 925 Clifton Ave., 07013.

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COMMUNICATIONS

CSMA Meeting Told:

Mixed Vendor Networks Need Strong User Control

By Ronald A. Frank
Of the CW Staff

CHICAGO — Communications managers with mixed vendor equipment can avoid maintenance disputes by keeping firm control over their suppliers.

This was one of the main points made by Gerald Onken, communications specialist for the Midwest Stock Exchange, at a meeting of the Communications Systems Management Association (CSMA).

The session was part of the National Communications Week multi-city seminars presented by CSMA.

Onken told the small group of attendees that his firm issues weekly operating figures which detail equipment outages experienced during the previous period.

Each vendor's equipment is listed separately, together with a complete repair record that itemizes the malfunctions and corrective actions taken.

"No vendor wants to have the worst trouble records, so they all strive to keep their units operating properly," Onken said.

Data Network Design Package for 3270 CRTs Unveiled by Berglund

MOORESTOWN, N.J. — Berglund Associates, Inc., telecommunications consultants, have come up with a design system for communications networks that can simulate network layouts and compare cost-performance.

Designed for the IBM 3270 CRT system or independent equivalents, Berglund's Planet 70 includes a discrete event simulator, a multipoint, polled network synthesizer and auxiliary programs such as a response time distribution curve plotter.

The simulator logic, based on IBM 3270 line discipline, is aimed at specifying display and printer requirements, modems and line loading.

The synthesizer uses simulation results to obtain network layouts and the cost/performance of different systems designs.

The programs operate from a user-generated traffic profile, so they can also be used to assess requirements for new applications. The programs can predict where in a network an intelligent 3270 equivalent can reduce line transaction rates.

The system is supplied for access via a nationwide time-sharing service and allows for interactive design between the analyst and the programs. A typical run of simulator and synthesizer takes less than 20 minutes, the firm stated.

The \$2,500 installation fee includes user training and an eight-hour post-installation consulting allowance. Timesharing charges are extra at 60 cent/min. The firm is at Church Road and Roland Ave., 08057.

The Midwest Stock Exchange provides remote access DP services to stock brokerage firms. Called the Signet 80 system, the computer/communications network includes varying types of independent communications equipment, Onken explained.

Outages Cannot Be Tolerated

The Signet system processes security orders in real time and equipment outages cannot be tolerated, he said.

The system includes Rixon 1,800 bit/sec modems, Raytheon CRT terminals, GE teleprinters, Computer Communications Inc. front end, Vogue printers, and other equipment.

If a finger-pointing situation arises with one supplier blaming another vendor's devices for a malfunction, Onken told the attendees he has developed an efficient solution.

An in-house maintenance technician is dispatched to pinpoint and correct the malfunction and "then we bill the vendor who is at fault for our representative's time," he said.

In a related presentation, Roy Fagan from the communications staff at International Harvester Co., discussed the various trade-offs that must be considered by users planning to install non-Bell equipment.

Although primarily meant for the user of independent PBX devices, many of

Fagan's guidelines also applied to the interconnection of telecommunications equipment.

Size is not always a guarantee of an efficient equipment supplier, Fagan said.

Often the company with 10,000 employees is not as reliable as one with 100 employees, he added. "It isn't the quantity of people that counts, it's the quality."

Who Insures What

Users should clarify who will be responsible for insuring the independent equipment, Fagan said. Most suppliers normally cover any loss due to fire, floods etc. where their equipment is concerned. But they may require "that you write this on your insurance policy," he cautioned.

In justifying the ever increasing cost of networks, Fagan suggested that communications managers are usually on a firm footing if the increased expense is less than the rate of the firm's sales growth.

The assumption is based on higher communications costs caused by an increasing number of business transactions within the company, Fagan explained.

Support Needed

In a discussion on the proper ways to implement a new communications system, Anthony Ward, senior consultant with Booz, Allen and Hamilton, Inc., said communications managers must have the

support of their top management.

One way to achieve this support is to keep management fully informed on communications plans being considered for implementation.

The user should establish a study team of technical experts whenever major changes are contemplated, Ward said.

Carefully Define Needs

Communications needs should be carefully defined and then a formal request for Proposal (RFP) should be generated.

When a system design has been finalized, careful attention should be given to prospective users of the new communications services.

These in-house users should fully understand the new facilities that are being provided by the telecommunications department, Ward said.

A Tale of Four Cities

The national Communications Week program attracted less than 100 attendees in four cities. But a CSMA spokesman said the meetings had helped focus on the changing role of the corporate communications manager.

Most attendees at the sessions, held in New York, Philadelphia, Washington, D.C. and Chicago, agreed that communications managers must expand their interaction with data processing and financial staffs within their organizations, the spokesman added.

Intertel Introduces Modular Modem System Concept

BURLINGTON, Mass. — Intertel Inc. has introduced a series of modems with associated diagnostic and other system features for medium speed private line data users.

By combining the modems with associated capabilities, users will be able to reduce "indirect operating costs" according to the firm. In addition to announcing a series of 1,200, 2,000 and 2,400 bit/sec modems, Intertel also can provide modular options for dial-up facilities, modem sharing devices that allow four terminals on one data set, and multipoint testing to aid users in troubleshooting multipoint nets.

The new capabilities are being called Modem Communications Systems (MCS) and are designed to help medium speed users eliminate indirect costs caused by attempts at retransmission, fault isolation, or inefficient line utilization.

As an example of these capabilities, the multipoint tester will allow the operator to know exactly where network problems are before calling in maintenance representatives, the firm said.

The MCS line includes both central site and remote data sets, auto answer and call features, FDM capability to add multiplexing to a user's net, and auxiliary

data channels that allow TTYs to operate concurrently.

Prices for the new equipment will depend on the options chosen by the user.

For a system with 88 stand-alone and 12 central site 2,400 bit/sec modems including 88 multi-point test modules and a similar number of supervisory channel modules, the cost would be \$7,900/mo on a two-year lease, an Intertel spokesman estimated.

A comparable Bell installation using 201B data sets and 3002 lines with C-2 conditioning would be \$8,300/mo based on \$55/mo for the 201s under interstate tariffs.

A separate TTY capability would bring the cost up to \$15,300, while the Intertel channel module would allow the teletypewriter to operate over the same facilities, the firm said.

Intertel is at 6 Vine Brook Park, 01803.

DUV Construction OK'd by FCC

WASHINGTON, D.C. — The Federal Communications Commission has authorized AT&T to begin construction of its Data Under Voice (DUV) facilities. The approval gives the Bell System the green light to begin construction of the first leg of its Dataphone Digital Service (DDS).

Initial service, planned to begin in five cities early in 1974, will still have to await FCC approval of an AT&T tariff proposal.

The FCC approval included the statement that the telephone company may submit a proposed tariff "any time prior to completion of construction."

In addition to rates for the DDS service, the FCC said it will have to consider AT&T's plans for shared use, resale and interconnection of the DUV facilities.

The FCC authorization came a short time after the Office of Telecommunications Policy urged the commission to approve the DUV service if users are allowed to interconnect non-Bell equipment on a non-discriminatory basis.

OTP urged the FCC to specify that DUV facilities can be offered for "resale . . . through the addition of hardware and/or software to provide customized digital service."

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OTB Uses 1,400 Data Sets to Keep Bets Flowing

NEW YORK — This city's biggest business is not Macy's, or Gimbel's, or the Rolls Royce dealer on 5th Avenue.

It's the Off-Track-Betting Corp. which has a daily gross handle of over \$2 million and much more on special occasions, such as this year's Kentucky Derby, when over \$3 million was wagered in OTB parlors on this single race.

OTB has 112 betting parlors scattered all over the city and over a dozen major race tracks are all tied into the system.

Each of OTB's 112 remote parlors has a number of betting windows equipped with transaction

terminals. Data from these terminals is transmitted to and from the central computer facility in midtown Manhattan, using Vadic 1,200 bit/sec modems and dedicated 4-wire telephone lines.

In addition to the three or four 1,200 bit/sec modems in each of the parlors, there are Vadic 300 bit/sec modems used in dial-up networks to support the teletypewriter communications link and to act as a backup line in case a dedicated channel is inoperative. The parlors also have spare modems which can be switched into the system.

Another 400 to 500 modems

are housed at the central computer facility. At present, there are six racks of modems in the central area, providing a capacity of two hundred and eighty-eight 1,200 bit/sec modems and one hundred and forty-four 300 bit/sec modems.

Vadic was originally chosen by the Off-Track-Betting Corp. because it was able to quickly come up with a special modem having front panel carrier detect light, automatic diagnostic functions and the high degree of redundancy (one power supply for every two modems) that the specification called for.

A number of cost benefits have

also been realized. For example, the Vadic modems take up less floor space than Bell data sets at the central computer facility. Unconditioned lines can be used in place of C1 conditioned lines.

Also, cards in the Vadic modems are interchangeable, regardless of whether the modem is part of the central system or a stand-alone at a remote site, a feature which reduces the number of required spares.

The decision to purchase modems rather than rent them has saved OTB hundreds of thousands of dollars annually. For example, 202 modems rent for about \$50/mo and 103 modems

for \$30/mo. Compatible Vadic modems can be purchased outright for just a few hundred dollars. Based on the same monthly outlay, Vadic modems pay out in less than a year. With 1,400 modems — most of them 202 type — in the system this adds up to an annual savings of over \$500,000 after the payout point is reached.

By eliminating C1 conditioning on over 600 telephone lines, an additional annual saving of close to \$200,000 was realized by OTB.

OTB officials appreciate the built-in displays and diagnostics which make it possible to quickly test any channel; pinpointing the problem to the line, the terminal, the computer interface or the modem, without having to call in outside maintenance.

Flash Backs

To check out a particular channel, the operator or technician at the computer site merely throws the front panel test switch on the appropriate local modem. This modem now transmits a test signal (spacing frequency for approximately one second) down the line.

When this signal is detected by the remote modem at the betting parlor, its "carrier-on" light begins to flash, the output of its receiver automatically connects to the input of its transmitter, and the test signal is looped back over the line to the computer facility, causing the "carrier-on" light on the local modem to also commence flashing.

This test verifies that a complete link exists between the computer site and the betting parlor.

However, if there is a break in this link, the above conditions will not be observed and the following simple tests can be made to further isolate the problem:

- Either of both modems can be self-tested using a local loop-back test which ties the output of the modem's receiver to the input of its transmitter, again observing the "carrier-on" light for a flashing condition.
- A test set can be patched into the system at the computer site so that a detailed error analysis can be made of that particular channel.



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United Video is not a newcomer to the communications field. For a number of years we've carried television signals for CATV franchises in cooperation with our parent organization, LVO Cable, and are making arrangements to provide transmission services for network television signals in a major southeastern routing. All told, the company currently operates 1300 miles of microwave routes, and has filed applications with the FCC for an additional 5000 miles.

At the same time, we've been constructing a 700-mile Dallas to St. Louis data transmission network utilizing the most advanced microwave technology which is scheduled for service in Fall, 1973. This network will form the basis for the company's communications capability through much of Mid-America. Application for additional routes has also

been filed. This specialized common carrier service is designed both for companies located in the midwest and south and for those in other regions of the country wishing "pass along" services on message traffic going from coast to coast.

In offering these services, United Video looks to best the competition, old and new, in two key areas: 1) **cost**—For long term users standard UVI tariffs will be approximately 30% below the recently filed new Bell tariff and only half of the current Bell charge—and 2) **responsiveness**—unlike the telephone company, the direct line user will be our primary revenue source and we aim to do everything possible in our power to make sure he's getting premium, trouble-free service.

Our abilities to deliver in these key areas are among the reasons why we think you'll want to take a closer look at this new alternative to your present approach to direct line service. There are more, but these should give you the general idea. For further information on United Video's capability in data and voice communications, call collect to (918) 587-1171 or write: United Video, Inc. Attn: Marketing Department, P.O. Box 2686, Tulsa, Oklahoma 74101.



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SYSTEMS & PERIPHERALS

Bits & Pieces

Add-on Memory for 370/135 Allows Double IBM Limit

SAN FRANCISCO — Itel Corp. has announced the availability of monolithic main memory extensions beyond IBM designed limits for the 370/135.

IBM's present limit for the 135 is 240K bytes of main memory. Itel's add-on allows users to expand their 135 up to 480K bytes.

Delivery of the new memory extension is set for November, 1973. Deliveries of the direct replacement memory — the first 240K bytes — will begin in August, 1973.

A three-year lease on the 240K of extended memory from Itel will be about \$3,825/mo. The firm is located at One Embarcadero Center, 94111.

On-Line Buffer Compares For Speed Differentials

SANTA CLARA, Calif. — An intermediate storage unit, announced by Plantronics, acts as an on-line interface between parts of a computer system operating at different speeds.

For example, data from a central processor can be received by a slower teleprinter using the Model 1300A Electronic Storage Unit by routing the data characters to the storage unit — or buffer — and storing them in electronic memory until read out by the printer.

The basic buffer unit provides storage of 2.5K char. and is expandable to 20.4K char. with additional plug-ins.

The 1300A receives incoming 5-, 6-, 7-, or 8-level serial data at any transmission rate between 37.5- and 2,400 bit/sec.

Output rates can be selected up to 1,200 bit/sec. with full storage, or to 2,400 bit/sec. at a reduced capacity of 10 kchar.

Basic price of the 1300A is \$1,595 from the firm at 385 Reed St., 95050.

Interface Allows CDC CPUs To Use Varian Plotters

IRVINE, Calif. — Varian Data Machines has released an interface unit to allow users to attach the firm's Statos 3110 plotter or 3111 printer/plotter to any CDC 3000, 6000 or 7000 series computer.

The Model 31-115 interface is directly plug-compatible to the standard CDC data channel cables and comes with an I/O cable which mates with the I/O connector on the Statos units. The interface is capable of data throughput at full CDC rates of 200 kbyte/sec.

The Model 31-115 is priced at \$12,000 from the firm at 2722 Michelson Dr., 92664.

Reader Offered in Two Versions

BRISTOL, Conn. — A photoelectric tape reader, available from Superior Electronic Co. — has a reading rate of 200 to 1,000 char./sec. synchronously and 0 to 60 char./sec. asynchronously.

The model TRP 1000R has a search/rewind speed of 1,000 char./sec. The unit includes reels that hold up to 750 ft of standard 8-channel tape. An alternate unit (Model TRP 1000F) is available for fanfold tape and comes with trays for up to 200 ft of tape.

Price of the TRP 1000RI (tape reel model) and TRP 1000FII (fanfold model) are \$1,475 and \$980 respectively from the firm at 383 Middle St., 06010.

Correction

The price of the Calcomp 1036 plotter [CW, June 20] is \$22,720. The associated 915 controller, needed for off-line operation is available in memory sizes ranging from 8K to 32K word (9-bit word) at a cost ranging from \$26,400 to \$38,200.

Higher Level Languages

Minis Permit Users to Mix Memories

By Michael Weinstein

of the CW Staff

SOUTHBORO, Mass. — Data General has added two minicomputers to its Nova series that offer users the ability to mix memories with different cycle speeds to best meet particular application needs, the ability to use higher level languages and low hardware costs; but the minicomputers must be bought in quantities of five or more.

The Model 2/4 and 2/10 will compete

internally with Data General's 1210 and 1220. Externally they will compete with mini's such as DEC's PDP-11/05 and the Interdata 74.

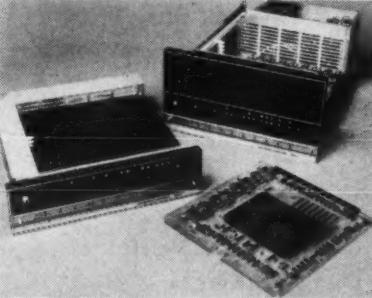
The basic difference between the two new models — Nova 2/4 and 2/10 — is that the 2/4 holds a maximum of four printed circuit boards while the 2/10 holds a maximum of 10 boards.

The ability to assemble different minicomputers by choosing different boards is the major feature.

Memory modules (each on one board) are available in three sizes: 4K words (cycles at 0.8 μ sec and costs \$2,000); 8K words (cycles at 0.8 μ sec and costs \$2,200); and 16K words (cycles at 1.2 μ sec and costs \$3,500).

Thus, users can order systems that best marry speed requirements with costs.

One board that would be common to any assembly would be the central proc-



Data General Nova 2s

essor — cycle time 0.8 μ sec. It offers performance comparable to Data General's Nova 800 central processor, which occupies two printed circuit boards.

The new CPU lets users mix the 1.2 μ sec 16K word memory with the faster (0.8 μ sec) 4K and 8K word modules without altering either hardware or software.

Overlapped Memory

Another feature, overlapped memory operation, increases system throughput permitting the CPU to begin reading the next address in a program while rewriting the data previously accessed back in the core location from which it was taken. Without overlapped operation, the CPU would wait until the data was rewritten into memory before reading the next address.

In any case, the central processor module has a cycle time of 0.8 μ sec and like memory is 16 bits wide.

A second strongpoint for the new Nova 2s is operating and language software available: Real Time Disk Operating System, Real Time Operating System, Stand Alone Operating System and four high level language processors: Fortran 5, Fortran IV, Basic and Algol.

The combination of low cost memory



Wayne G. Spielman, vice-president for administrative operations at Wells Fargo Bank's Sonoma Mortgage Division, and Larry Bonin examine the first installed IBM 370/125.

Key-to-Disk System Supports 8 Stations

BURLINGTON, Mass. — Entrex Inc. has introduced a new key-to-disk data entry system: the System 80 which consists of a central processor which controls up to eight Data/Scope keystations and a disk subsystem providing 2.4M characters of on-line storage.

Data stored on the intermediate disk subsystem is allocated dynamically — recorded without regard to physical segments.

Output is on magnetic tape, either 7- or 9-track at 800 bit/in. or 9-track at 1600 bit/in.

Standard editing checks include: mandatory entry and completion fields, batch totals zero balance, automatically emitted data, error flag insertion, and search for record.

A typical System 80 with eight keystations can be leased from \$1,458/mo from the firm at 168 Middlesex Turnpike, 01803.

Impressive Reliability

The reliability of the system during this infancy period has been impressive to Bonin, who states he was slightly worried when he learned that his 125 would be the first.

"There are understandably problems when a computer is first introduced, but we have experienced almost no problems. Those that have occurred have been very slight and immediately repaired by IBM," he noted.

Going back to his selection criteria, Bonin stated that he had considered the 370/135 but his initial needs and those he could forecast in the near future only required the processing power of the smaller 125 and thus, he asked rhetorically, "why spend the extra money?"

While he noted that it might be more difficult to hang non-IBM peripherals on his 125 mainframe (because the controllers are built into the chassis) he said this aspect did not bother him.

"The computer was obtained to perform a particular result, and as the present system will more than perform that specified task, we can not see the need for other peripherals."

*Nova 2 figures based on order of five computers.

Price Comparison Between Novas and DEC PDP-11/05

with the ability to use higher level languages acts to permit users to write application software more easily and still control hardware costs.

Software Options

Other software available for the Nova 2 series includes standard and relocatable assemblers, editors, cross assemblers (for IBM 360, Univac 1108, CDC 6600), diagnostics and utility programs. All programs written on the Nova 2 are compatible with other Data General computers.

Standard hardware options include automatic program load, power monitor/auto-restart, a turnkey console, hardware multiply/divide, and a real-time clock.

The one apparent major drawback of the new Nova 2 offering is Data General's decision to set the minimum initial order at five machines. The rationale given by Data General for this arbitrary cut is that marketing and scheduling restrictions prohibit allowing single orders and maintaining the same pricing structure.

Memory Size	Nova 2/4	Nova 2/10	DG 1220	PDP-11/05
4K	\$3,850*	\$4,750	\$5,250	
8K	\$4,350	\$5,250	\$6,650	\$6,495
16K	\$5,950	\$6,850	\$10,750	\$10,895
32K	\$9,250	\$10,150	\$18,950	\$20,585

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- SKOKIE, ILL. 60076, 7620 Gross Point Road, Phone: (312) 965-7550
- DALLAS, TEXAS 75207, 2711 Irving Blvd., Phone: (214) ME 1-8770
- MONTEBELLO, CALIF. 90640, 1501 Beach Street, Phone: (213) 685-3069

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RCA

Shopping at Home by Phone

Getting Bargains Without the Walking

By Toni Wiseman

Of the CW Staff

WASHINGTON, D.C. — Want a radio, but don't feel like walking the stores for the best buy? Call "Guthrie" and he'll take care of it for you.

"Guthrie" is Computer Shopping, Inc.'s (CSI) CPU, the heart of an electronic, in-home shopping system slated for implementation in the Washington area by Oct. 15. The system will allow the consumer to hear computer-generated price quotes over his telephone and, in many cases, place an order if he so desires.

The CSI network includes more than 20 Intel mini-computers each with a 4K word semiconductor random access memory, and a number of Votrax V phone synthesizers used to translate digital input to voice output.

To use the system, the consumer looks through a merchandise catalogue (for which he has paid \$4), finds the special code for the item he wants, and dials

G-U-T-H-R-I-E on a Touch-Tone phone.

Guthrie maintains on-line storage of more than 300,000 prices, ranging from \$1 to \$10,000.

When the computer "answers," the consumer dials in his identification number and the product code. He then hears a computer-generated voice response giving him the five lowest prices asked by different merchants in his area and the names of the merchants. The customer is charged one cent for each price quote.

On sales of \$10 or more, the consumer can place his order electronically by pushing the "★" button on his phone when the computer asks him to do so.

In most cases, Ahern said, a human operator will then come on the line to verify identification and record the planned mode of payment which may be either COD or store-held for pickup.

Within 18 months, according to Ahern, technology should be available to permit high-speed

transmission of color images over voice-grade telephone lines, allowing the consumer to see the products on his home television screen. "This service will be optional, however," Ahern said, "since the equipment will be quite costly."

S/3 Option Converts Cards To 96 Columns

HORSHAM, Pa. — An optional feature for the Decision Data 9601 or 9610 data recorder allows System/3 users to convert 80-column punched cards into 96-column punched cards.

The 80- to 96-column card conversion takes place off-line with the hardware consisting of an 80-column reader interfaced to either data recorder. The cards to be converted are read by the 80-column card reader and their electronic card images forwarded to the data recorder for automatic punching (and printing with the 9610) into 96-column cards.

Card conversion is accomplished at 60 to 120 card/min.

For current data recorder users, the optional conversion feature is field-installable on any existing 9601 or 9610.

The addition of the option does not alter the user's ability to use his 9601 or 9610 in a standard operation to punch and verify 96-column cards.

Rental rate for the 80- to 96-column card converter only — users must add the cost of either the 9601 or 9610 — is \$100/mo on a three-year lease. This price includes maintenance charges.

Decision Data is at 100 Witmer Road, 19044.

Univac Opens On-Line Aid Center

ROSEVILLE, Minn. — Univac has established a Total Remote Assistance center here to receive diagnostic data from user installations over telephone lines, analyze the data and transmit instructions for corrective action back to the site.

In its present operation, the center is providing this service only to users of the 1110, but plans to expand the service to other product lines.

The Univac customer engineer at the user's site can either verbally relay information to system experts at the center or link the user's system to the center's 9300 for data transmission. For user security, the

connection must be initiated at the user's installation.

When connected via a telephone interface, the 9300 here can remotely scan the maintenance and operating panel, remotely set the operator's panel, duplicate keyboard and console functions, test dial-up terminal equipment, verify system configuration and provide other diagnostic information, a spokesman said.

Additionally, the central system maintains a data base file of all calls for assistance which is used to provide historic information that can lead to quicker solutions.

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Interdata Users Offered New Peripheral Series

OCEANPORT, N.J. — A family of peripherals — including a 10M-byte disk subsystem, 1,600 bit/in. magnetic tape transport, two video display terminals and a 600 line/min printer — has been announced by Interdata, Inc.

The new peripherals, designed to match the operational characteristics of the firm's "New Series" minicomputers, will operate under any general-purpose Interdata operating system — Real-Time Operating System (RTOS), Disk Operating System (DOS) and Basic Operating System (BOSS).

Handles Four Drives

The cartridge disk subsystem has a storage capacity of 10M bytes, a transfer rate of 330 kbyte/sec and an average access time of 38 msec. The controller will handle up to four drives.

A standard 2.5M byte cartridge single drive disk subsystem with a 180 kbyte/sec transfer rate and a 70 msec average access time is also available.

The new magnetic tape transport is IBM 9-track compatible. Density is 1,600 bit/in. with tape speed rated at 45 in./sec. The unit includes a phase-encoded formatter for use with four transports.

The first video display is an alphanumeric unit with a display capability of 80 char./line over 24 lines. Transmission rates are from 110- to 9,600 bit/sec.

The second alphanumeric video display is designed as a replacement for Teletype-type terminals. This unit has the same operating specifications as the previously mentioned terminal.

System Encodes, Corrects Checks For Small Banks

RESTON, Va. — Small banks can obtain a check rehabilitation, scanning and encoding system that produces or corrects checks and other MICR documents, from Optical Recognition Systems, Inc.

The two components of the system are the Checkmate/1 check rehabilitation facility and the ORS 1010 Scanner/Encoder.

The Checkmate/1 automatically applies a correction label to the back of MICR rejects. The label strengthens the top, leading edge and bottom of any check, extending 9/16 in. below the check for recoding.

The scanner/encoder automatically feeds and reencodes the checkmate repaired checks, under control of its own internal minicomputer.

The combined system will handle any normal reject — including checks that are torn, creased or curled — in all American Bankers Association specified check sizes, plus 51-column tab card documents.

Present rental prices for this system are \$980 and \$230 for the 1010 Scanner/Encoder and Checkmate/1 respectively, including maintenance. Checkmate labels are \$6.60 per thousand from 1928 Newton Sq. West, 22090.

Two fully buffered line printers — 200 line/min and 600 line/min — incorporate 64 character sets and print across 132 column lines.

Third Printer

A third line printer to be made available in the third quarter of 1973 is a fully buffered unit with speeds rated at 60- to 200 line/min. This unit also has a 64 character set printing across 132 column lines.

New card equipment includes a 400 card/min reader, a 300 char./sec paper tape punch and a

Peripheral	Cost
10M-byte Cartridge	\$12,000
Disk System	\$10,000
2.5M-byte Cartridge	\$10,000
Disk System	\$10,000
1,600 Bit/in. Tape	
Transport Plus Formatter for 4 Drives	\$12,000
Additional 1,600 Bit/in. Drives	\$6,800
Alphanumeric Video Display	\$3,400
TTY Replacement Display	\$2,300
600 Line/Min Printer	\$17,150
200 Line/Min Printer	\$12,350
60-200 Line/Min Printer	\$5,000
400 Card/Min Reader	\$3,000
300 Char./Sec Paper Tape Reader	\$1,300
300/75 Char./Sec Paper Tape Reader/Punch	\$3,000

Cost of Interdata's Peripherals

300/75 char./sec paper tape reader/punch.

Interdata is headquartered at 2 Crescent Pl., 07757.

155, 165 Get Replacement Memory

MINNEAPOLIS — The Model 155+/165+ monolithic memory systems from Fabri-Tek are plug-to-plug compatible memory systems for the IBM 370/155 and 165.

The add-on memory can replace all or specified portions of IBM memory up to 1M byte per cabinet enclosure.

Storage capacities for the 155+ are 256K, 512K, 768K and 1M bytes. Cycle time is 2.1 μ sec. with access time rated at 800 nsec.

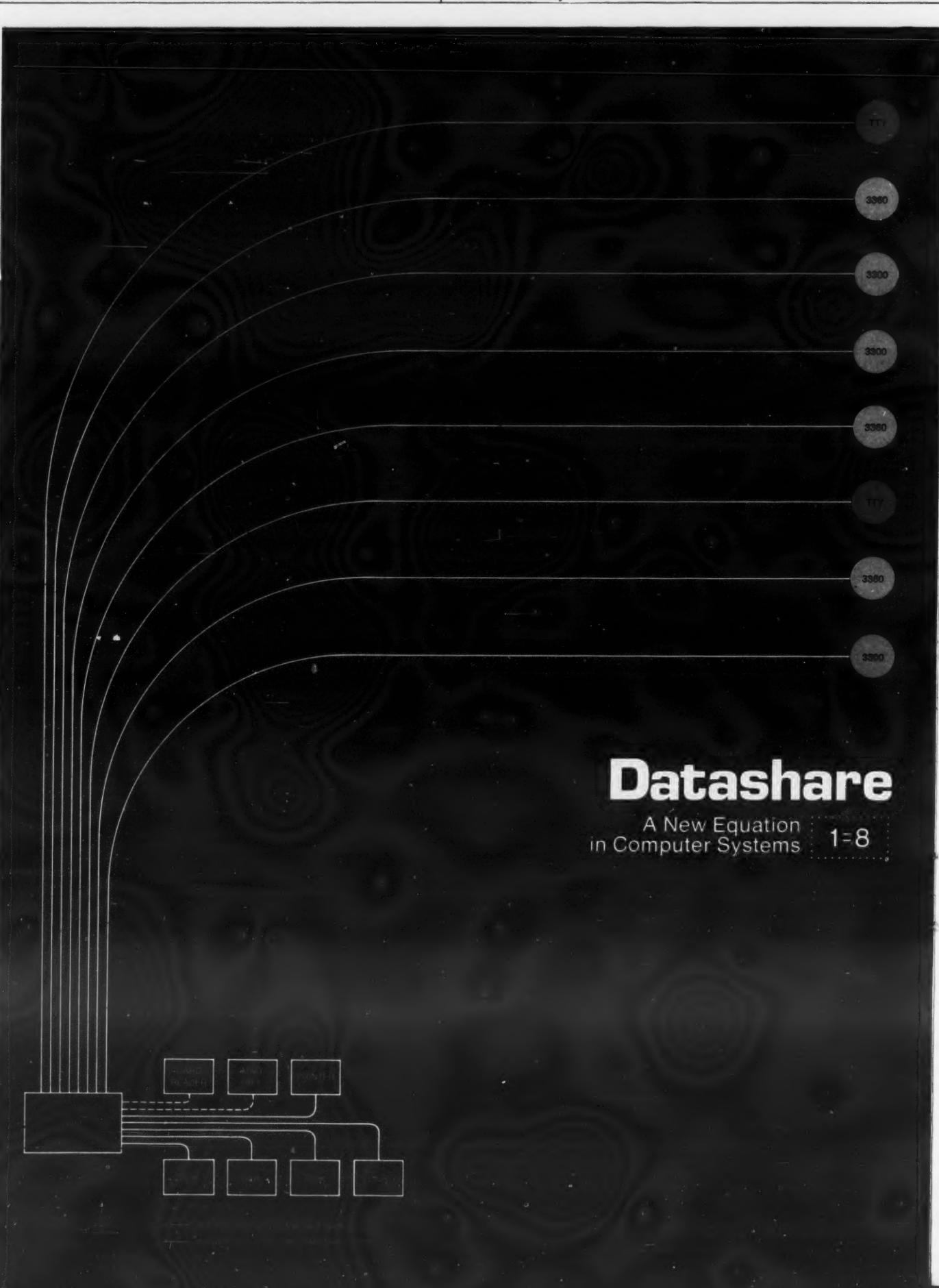
Storage capacities within the 165+ series are 512K and 1M byte. Cycle time is 2 μ sec with access time rated at 1,200 nsec. Effective density of the Fabri-

Tek system is four times that of IBM's 3360 processor storage and dissipates about 50% less heat, a spokesman said.

The Fabri-Tek add-on incorporates a self test unit and field engineering panel which allow test engineers to run off-line diagnostics without unplugging any cables.

Error correction code electronics detect and automatically correct single bit errors.

Leasing cost runs about 75% of IBM for memory of equivalent sizes and the Fabri-Tek purchase price is about 50% that of IBM from 5901 S. County Road, 55436.



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Glaser Promises Active Reign as Afips Head

By E. Drake Lundell Jr.

Of the CW Staff

NEW YORK — A substantial part of the new Afips president's time will be spent in reviewing planned new activities and beefing up the present ones, George Glaser, the new man at the top, said in an interview last week.

He also noted a great deal of his time will be spent trying to make the Afips offer of membership to DPMa a reality.

The board and the organization probably spend more time on structural and procedural problems than they should, he said. He will form an ad hoc new activities committee within the

organization to review present Afips programs and project new ones.

The new group will be made up largely, if not entirely, of members of the board of directors in order to involve them more intimately in Afips projects and programs.

As a program example he noted the work done by Don Parker's Committee on Professional Certification stating the new ad hoc group could explore ways to make sure the public is aware of this type of work, since it has broad applicability to industry.

The group might also contact the "Computer Foundation"

(now the Institute for the Certification of Computer Professionals, ICCP) to see how the work of the two groups could be meshed.

But while Afips is willing to

Societies/ User Groups

support the activity as much as it can, he noted ACM has taken a leadership role on the ICCP and said it is not Afips' intention to try to "take over" the ICCP, just work with it.

Another important area which will be emphasized, he said, is

the statistical research functions of Afips.

In addition, Glaser said the board has raised the Afips public information budget substantially so this area will get more emphasis under his presidency.

As part of the public information effort the organization would continue to offer its expertise to congressional agencies and other governmental groups if it is needed, but he indicated the opening of a formal Washington office to carry out his liaison would not be high on his list of priorities.

Glaser said it is too early to tell what new ideas and the ad hoc



George Glaser

committee will develop, but it will clearly have the charter to recommend new areas for action.

Now that the first National Computer Conference has been completed successfully, Glaser said, he would not have to spend much time in this area as did the previous slate of officers who were responsible for getting the first one going. He agreed fully with a resolution of the board that Afips should not get involved in any other domestic show activities outside of the national meeting.

"There are too many conferences now," he said, "and I find it difficult to believe we need more of any sort."

At the same time, he emphasized the need for more bilateral international conferences with Afips participation, like the first U.S.-Japan conference.

Glaser also hopes to get the board members involved in more activities within the organization, serving as either chairmen or workers on various proposed projects.

Noting that "I'm a very pragmatic guy," Glaser said he does not want to "waste board time over jurisdictional disputes" between Afips and the constituent societies.

Afips should undertake those projects that are legitimately within its realm of interest, if it is not crystal clear that the constituent societies could do as well as Afips could and if the funding is available for them within Afips and not elsewhere.

There is also a need for better visibility of certain Afips undertakings and for improvement in project quality control in some areas, he said.

Stock Exchange Expands

TARZANA, Calif. — A brokerage customer will no longer have to worry about round and odd lots when selling on the Pacific Stock Exchange (PSE).

PSE has expanded its Comex automatic stock transactions system to the execution of round-lot market orders up to 199 shares. Comex previously handled only odd-lot orders (orders less than 100).

The computer performs three tasks simultaneously: it reports the details of the trade to the originating broker's office; reports all essential details of the transaction to the PSE's Clearing Corp.; and advises the appropriate Pacific specialist of the execution details and logs the time of the trades — all within less than a minute.

Computer Misuses Listed

WELLESLEY HILLS, Mass. — *Computer Security, Auditing and Controls* is a new bibliography of materials published over the last 10 years dealing with the questions of computer misuse and fraud, sabotage and other accidents or acts of nature. It costs \$6.50 from Management Advisory Publications, P.O. Box 151, 02181.

Datashare from Datapoint Corporation constitutes an important innovation in the use of computer systems for business administrative and management applications. Through Datashare, the full capability of a single Datapoint 2200 computer system is made available simultaneously at as many as eight remote user stations on terminal units as various and as inexpensive as Datapoint 3300's, Datapoint 3360's and standard teletypewriter machines.

With well over two thousand Datapoint 2200 systems currently in use, this versatile low cost system has established an enviable reputation as an all purpose business computer. Now through the Datashare programming package, as many as eight remotely located users can utilize a Datapoint 2200 system as though it were their own on-site computer for on-line data input tasks and other general business applications. But with these key differences: this access is achieved (1) at just a fraction of the already low cost (prices begin at \$6,040) of the 2200, and (2) without the waiting and inconvenience often associated with the usage of an on-site computer.

Through Datashare, business and commercial computer users can enjoy the full benefits of the many recent advances in computer and data communications technology incorporated into Datapoint equipment. Through the combination of

the Datashare system and the Databus programming language, users can readily create application packages for most general management and administrative needs such as real-time inventory control, parts replenishment, production scheduling, labor distribution and other dynamic applications involving volume data input from multi-locations and associated production of reports.

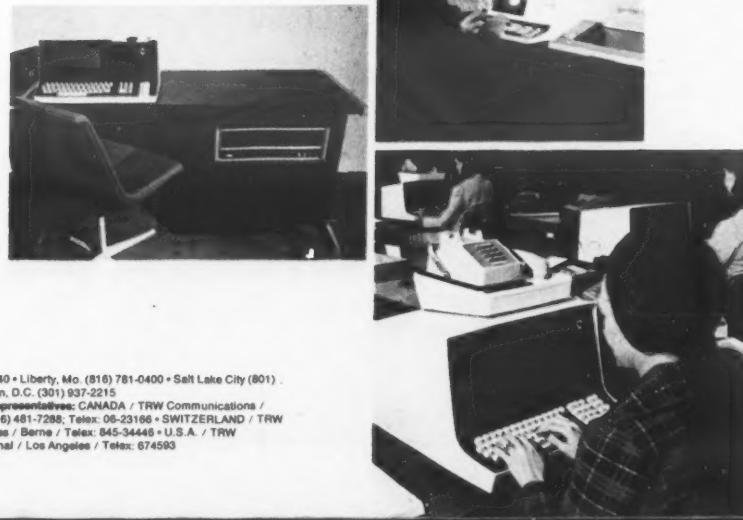
Each remote user on a Datashare system accesses the central Datapoint 2200 independently from his own terminal unit, for his own application needs. For users in close physical proximity to the 2200 as in the same facility or building complex, communications with the central computer is obtained through direct wiring. For cross-city or cross-country users, linkage can be provided through standard telephone service.

The central Datapoint 2200 system used with Datashare can incorporate from one to four disc file units each capable of storing 2.4 million characters of informa-

tion in replaceable cartridges for user data files and programs, and a high speed printer. For "Off-line" use as a standard 2200 system, the configuration can also include a card reader, 7- and 9-channel magnetic tape units and other Datapoint peripherals as well as the disk units and printer.

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Users Gain as Multi-Media Vendors Improve Products

Self-study data processing instruction moved into its second generation about four years ago with multi-media packages supplanting written programmed instruction manuals.

Advanced Systems, Inc. (ASI) introduced the concept and Edutronics followed shortly afterward. Deltak entered the market about two and one-half years later. Its late entry gave the company an advantage in the design of its materials — improving weaknesses in competitors' products.

Now ASI and Edutronics are redesigning, improving on the Deltak courses!

There will probably be a "seesaw" effect from here on, without clearcut generations of improvement.

In any event, the fierce competition has produced some excellent results for customers of these organizations. Our experience shows that both industry and academia can expect to benefit by the continuous improvements.

Deltak's courses were used as an integral part of the University of Colorado's information system curriculum this year — with excellent results.

Perhaps the most important result is the restructuring of the system analysis and design course, to better utilize the capabilities of the faculty. Because students were learning basics through self-study of the Deltak materials, I was able to spend my time working with students on a small group and individualized basis.

Instead of having to prepare lectures on principles and concepts, I had time to design projects to insure each student had practical experience in system development and implementation, either in industry or on a university system.

The two-semester system analysis and design course is the key to our information system curriculum.

Students in the first semester course received 50% of the course credit through covering the Deltak system analysis and design materials on a self-study basis.

For the three-semester hour course, the students averaged 8.5 hours of work outside of class per week during the period they covered the Deltak course. The 21-module course was covered in eight consecutive weeks.

The end-of-module problems are rigorous, comprising better than half of the weekly study time.

Although they complained about the workload, the student evaluations at the end of the semester showed they felt the course was excellent.

The Tutorial

Each module of the Deltak course has a tutorial guide which provides solutions to all problems assigned and suggests a format for a tutorial session.

(This guide can be effective for

industry where the instructor is usually a professional whose skills are needed in system development and who has little time for class preparation.

The Deltak course for users is an integral part of the second semester of our systems analysis and design course.

Many students are attracted to this course, yet do not have enough computer background to handle its more technical aspects. Realizing, however, that understanding the non-DP-oriented end-user's perspective is one of the keys to successful installations, we permitted students majoring in other disci-

pines to register for this course. To raise their understanding of the terminology and concepts of MIS, they were assigned the Deltak material on a self-study basis.

Our systems analysis course was case-oriented. All students read the same case. However, the information systems majors were assigned technical questions while the other students were assigned user-related questions.

As a result, the class period approached a real-life situation where technicians and end users met to resolve issues concerning MIS design and implementation. In keeping with the ACM-recom-

mended guidelines, we have developed a qualifications input/output matrix for each student, identifying knowledge and skills levels required for professional competency in the field.

Some students enter the program with proficiency already obtained in some areas. Others start from scratch. To avoid repetition in areas where the majority of students already have a proficiency, self-study modules are assigned to elevate weaker students.

Also, for a student who has special interest, e.g. data communications, it is possible to allow project credit for special

self-study modules. This approach provides the opportunity for greater depth in his subject area than that necessary for all students.

Until recently, cost of courses by ASI, Edutronics and Deltak has been high enough to discourage academic institutions from acquiring these materials for use in their elective courses.

As shown above, such courses are clearly cost-effective in the industrial training environment, by taking less preparation time of skilled professionals.

Couger is professor of computer science and management at the University of Colorado.



J. Daniel Couger
On
Education



Acute Care Center Patients Benefit From DP Addition

ANAHEIM, Calif. — Constantly improving patient care is the watchword at Anaheim Memorial Hospital here. And this maxim was recently underscored when the 240-bed medical facility installed a computer system to serve its Acute Care Center.

The system serves the four vital areas of the Acute Care Center — coronary, progressive care, medical-surgical and pulmonary. The system utilizes an arrhythmia technique to monitor patients' heart patterns and pulse repetitions.

The Beehive MCS 100 from Beehive Medical Electronics can

monitor the heart performance of up to 32 patients simultaneously and can be used to predict coronary difficulties.

Comprising a computer and five terminals, one of which is portable for special bedside uses, the system records, stores and interprets data on each patient's vital signs. This information is either fed into the computer automatically via patient-connected electrodes and bedside monitors, or by nurses utilizing terminal keyboards to enter changes in patient condition and a variety of daily procedures.

Upon recording the informa-

tion, the computer will sound an alarm if things aren't going right. It will also formulate trends which allow physicians to review long-range patient progress.

"This immediate, accurate trend analysis feature of the computer is perhaps its greatest asset, because it instantly allows the physician to see what a patient has been doing over a period of several hours, something that would normally take 15-20 minutes of culling nurses' notes," said Dr. John Belt, associate director of the hospital's Acute Care Center and its chief of staff.

"The other far-reaching benefit

of the system is that it frees nurses from the arduous clerical task of gathering reams of information for notation at the end of the day and allows them to devote more time to crucial bedside care," he added.

Belt explained a typical example of the time-saving feature of the computer. When a nurse aspirates (withdraws elements by suction) a patient, she enters this information into the nearby stationary terminal (or the roving bedside terminal) which relays it to the computer for storage. At day's end, the physician can request information on a patient from the computer and see that

the aspiration procedure was completed at a particular time.

"The physician can see function trends information in a minute from computer printouts," Belt added.

College Compiles Business Data

By H.R. Koslowsky

Special to Computerworld

CHENEY, Wash. — An economic and business data bank covering Spokane and Spokane County has been compiled by two Eastern Washington State College (EWSC) professors here.

Although originally devised for use by EWSC classes in economics, the information is now available not only to students and faculty members, but to commercial and non-profit organizations as well, through computer facilities at the college.

Dr. Tsung-Hua Liu and Dr. Shih Chun Young, faculty members in the EWSC department of economics, took scattered data collected and recorded by various private and public agencies and brought it into a single collection.

Almost 150 series of Spokane annual data, some dating back to 1949, are on file. Subjects covered include population, income, employment, sales, automobiles, electricity used, construction, school expenditures, bank debits and building permits.

All of the information, the two EWSC professors said, is available elsewhere but it comes from so many sources that attempting to contact the right agency to get needed data has in the past been time-consuming and frustrating.

Liu and Young, along with advanced economics students, are keeping the file up-to-date and expect shortly to put most of the data on a monthly or quarterly basis.

Other study areas at EWSC such as geography, sociology, business, industrial technology and urban and regional planning are using the information for instructional purposes.

The present economic and business information is only the first stage of the data bank, Liu and Young said. They plan to move into such fields as social behavior, health, crime and other problems.

One application of immediate interest, the two EWSC professors believe, will be the ability, through use of the data bank, to measure the impact Expo '74 will have on the Spokane economy.

The project is funded jointly by the EWSC Bureau of Business Research and Management Service and the department of economics.

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Lawyers Compare Notes With Systems Designers

BOSTON — The Computer Law Association will hold a meeting, in conjunction with the American Bar Association, August 8 at the Army-Navy Club, 17th and "I" Streets, N.W., Washington, D.C.

The morning session on "Discovery and Trial Support Systems in Large Cases" will explore the problems encountered by lawyers and systems designers in developing and using support systems for handling documents and other evidentiary elements during discovery, brief preparation and trial.

The afternoon program will consist of a series of concurrent roundtable discussions. The topics will include contracting problems, software protection, tort liability, security and privacy, evidentiary problems, interconnect and standards.

Further information is available from Computer Law Association, c/o Robert P. Bigelow, 28 State St., Room 2200, 02109.

Nasis Meets to Share Common Problems

CHICAGO — The Fifth Annual Meeting of the National Association for State Information Systems (Nasis) will be held Aug. 6-8 at the Hotels Ambassador-East & West.

On Monday morning Dr. Ruth M. Davis, National Bureau of Standards, will discuss "Automation: The Way to Avoid the

Societies/ User Groups

Impending Crisis of Public Services." That afternoon Commander Grace Hopper will speak on the subject of distributive computing systems.

"Data Banks in a Free Society" is the topic of Prof. Alan F. Westin's lecture on Tuesday morning. This will be followed by a summary report of the Nasis Security and Privacy Committee.

Election Problems

A joint workshop with the National Legislative Conference is scheduled for

Tuesday afternoon on "The Administration of Elections Computerization and: Statewide Voter Registration."

The session will highlight some of the problems state legislatures can expect to encounter. During the workshop, the Government Accounting Office will discuss its plan for setting up a registration model.

The schedule for Wednesday includes a systems sharing panel, with a study of the Ohio Centralized Payroll-Personnel System. The panel will also discuss common

problems which affect the transferability of applications from one state to another, such as proprietary software, lack of a coordinating agency and lack of standards.

The annual Nasis business meeting will also be held Wednesday.

Registration of the conference is \$40 for members, \$50 for vendors, and \$15 for wives. Further information is available from Miss Sandy Stratton, Nasis Secretary, The Council of State Governments, Iron Works Pike, Lexington, Ky. 40505.

Engineers View Productivity

HENNIKER, N.H. — A conference on "Making Service Industries More Productive Through Computers and Automation" will be held at New England College Aug. 12-17.

The conference is being sponsored by the Engineering Foundation and the Institute for Computer Science and Technology of the National Bureau of Stan-

dards.

The objectives of the conference are to identify gaps in knowledge within applicable technology and administrative disciplines, identify business, government and societal needs and opportunities, as well as appropriate governmental goals and programs to respond to these needs.

What Is It?

Session discussions will cover the definition and measurement of productivity as applied to public services and service industries, technologies for improving productivity in the service areas and automation opportunities.

"Institutional Barriers to Innovation and Diffusion in the Service Sector" and "Government Roles, Policies and Programs for Productivity Enhancement through Computers and Automation" are among the workshops scheduled for the conference.

The registration fee is \$160, which includes lodging and meals. Further information is available from the Engineering Foundation, 345 East 47th St., New York, N.Y. 10017.

IEEE Revises Charter, Will Conduct Surveys

NEW YORK — The IEEE has completed the revision of its Certificate of Consolidation. The amended certificate will permit IEEE to engage in programs concerning the professional activities of its members.

IEEE will also be able to conduct and publish surveys and reports of professional concern, collaborate with public bodies and other societies, and establish standards of qualification and ethical conduct.



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75% increases. Scheduling flexibility is markedly improved. A job that now takes 20 hours may be accomplished in 10 or 12. And more jobs can run concurrently.

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COMPUTER INDUSTRY

CI Notes

Univac Buys ISS

NEW YORK — Univac has agreed to purchase ISS, an Itel subsidiary for cash. ISS makes direct access memory units. The purchase is scheduled to take place July 31, subject to the fulfillment of certain conditions.

At that time under terms of the agreement Univac will make an initial payment of \$23 million. Additional cash payments are estimated to be \$7 million and will be based on ISS sales to customers other than Univac through the balance of 1973 and the full calendar years of 1974 and 1975.

ISS will be a wholly owned subsidiary of Sperry Rand and will operate under the Univac Division. ISS employs some 1,800 management, development and production personnel with major facilities in Cupertino, Calif. Itel plans to use the cash to expand its DP lease base. ISS will continue to develop and manufacture products for Itel.

CDC to Unwrap 'Mini'

MINNEAPOLIS, Minn. — CDC this week will introduce a "minicomputer" together with a line of specially designed peripherals. While described as a general-purpose machine, the unit can be configured with dedicated applications software for specific industries.

The system will be compatible with existing CDC 1700 applications programs and will interface with earlier 1700 peripherals through an I/O bus interface, the company said.

Supershorts

Photon, Inc. has reorganized its marketing operations with a view to strengthening customer service and enhancing future company growth. Service personnel will report to regional sales offices.

Data General Corp. is assembling core memory components at a new wholly owned subsidiary, Data General Hong Kong Ltd. of Kowloon, H.K.

Decision Data Computer Corp. has finalized an agreement with the Northern Ireland Ministry of Commerce that gives Decision Data the ability to manufacture its products in Europe.

Computer Sciences Corp. (CSC) has formed a System Sciences Division headquartered at Silver Spring, Md., to support scientific organizations in such areas as physics, engineering, system programming, scientific data processing and related disciplines. The new division's objectives include increasing the transfer of aerospace and military technologies to other applications.

3M Company has split its Magnetic Products Division into two divisions: Magnetic Audio Video Products and Data Recording Products.

Memorex has received a contract from Electronum to supply its 630 Disk Drives for attachment to the Romanian built Felix-250 computer.

Qantel Corp. has named C. Itoh & Co., Ltd. as its exclusive Japanese distributor.

General Computer Systems has installed its 3,000th GCS 2100 CRT terminal at Book of the Month Club.

Multimillion-Dollar Conspiracy Alleged

11 Charged in Theft of IBM Disk Designs

By Marvin Smalheiser

Of the CW Staff

SAN JOSE, Calif. — A nationwide investigation into the theft of IBM trade secrets allegedly worth \$660 million is being conducted following the arrest of eight persons in connection with industrial espionage involving three generations of IBM disk drives.

The eight persons have been released on bail ranging up to \$30,000 and arraignment is scheduled for July 12.

Three more persons, including the president of a now defunct company, are still being sought.

The alleged conspiracy, which also involved an offer to sell information on Memorex Corp.'s flexible disk drive, was uncovered after four months of investigation.

Police said the scheme concerned the theft of plans of three generations of IBM disk drives — the 2314, 3330, or Merlin and the 3340, or Winchester — as well as disk packs.

The thefts were said to date back to the late 1960s and resulted in IBM trade secrets being disseminated "throughout the industry," investigators said.

Efforts to Sell

Efforts reportedly were made to sell the secrets to Caelus, Control Data, Honeywell, Nashua, RCA and 3M.

San Jose police said the machine designs were stolen from IBM's General Products Division in San Jose and "sold to somebody in the computer industry" who changed the IBM logo on the drawings and substituted his own logo.

"The product was manufactured from the drawings," police said.

The district attorney's office in Los Angeles, which worked with San Jose Police, said IBM estimated the potential value of the stolen plans at \$660 million. The actual loss was put at \$10 million by IBM.

IBM spokesman, however, declined to discuss the case other than to say, "We cooperated fully with the police."

A Memorex official said the company was not a target of the alleged conspiracy although police are investigating and "it is possible Memorex may have been a victim. We don't know now that we have been a victim."

Arrested were one IBM engineer, two former IBM employees, a former Memorex buyer and a Memorex engineer. Officials of three other companies as well as four draftsmen were also implicated and charged, police said.

Charges

Ramon Serrata, the IBM engineer, was charged with 10 felony counts that included conspiracy, theft, offering or accepting inducement to steal trade secrets and receiving stolen property.

Phillip James Steckel, described as a retired IBM buyer, was charged with 15 felony counts.

Adolf Jarmann, an engineer employed at K and K Manufacturing Co., Campbell, Calif. and a former IBM employee, was charged with 12 felony counts.

Others arrested were: Phillip Kronzer, vice-president of K and K, David Hal Bunch, a senior engineer at Memorex, and Brunhilde Ida MacNevin, a draftsman, Thomas A. Finnegan, a buyer formerly employed by Memorex, and Wolfgang Arnold, a major stockholder of Computer Disc Mastertape, of Torrance, Calif.

Police said Arnold was a former associate of Steckel and Jarmann.

Arrest warrants were also issued for Wesley G. Powers, president of now-defunct Memory Magnetics International, also in Torrance and for two draftsmen formerly employed at Memory Magnetics. Simultaneous with the arrests, searches were made at five companies: Computer

Disk Mastertape, Forro Precision Inc., International Management Systems Inc., and K & K Manufacturing Inc., all in California, and Sigma Technology Inc., Phoenix.

Robert Fowler, president of Forro Precision, told *Computerworld* police were

making a thorough search of his company, but he disclaimed any involvement by his firm in the alleged conspiracy.

Walter C. Davison, president of International Management Systems, confirmed that his company had been searched but also denied any involvement.

Sales Attempts Detailed

CW West Coast Bureau

LOS ANGELES — A web of intrigue that reaches across the country has been described in an affidavit filed in Municipal Court here by police in support of search warrants at computer component firms believed to be using IBM trade secrets.

The affidavit describes undercover work, payoffs with marked bills and copying of IBM secret documents with miniature cameras.

The affidavit alleges an undercover agent was offered the complete project drawings for the IBM 3340 disk drive for \$100,000.

Other deals offered included plans for IBM's 2314 and 3330 disk drives, according to the affidavit.

The affidavit also claimed plans were made to sell disk pack drawings to Caelus, Control Data, Honeywell, 3M, Nashua and RCA.

An offer to sell drawings of Memorex Corp.'s floppy disk unit for \$7,000 was also described.

The affidavit was filed by San Jose Detective Sgt. Richard Frechette, who said it was in October 1970 that IBM became aware a "complete set of IBM 3330 drawings was being offered for sale to IBM competitors by various persons."

The disk drive was announced in June 1970.

Richard A. Callahan, manager of security for IBM's General Products Division in San Jose and a former FBI man, was hired to solve the thefts.

He worked with David Bourjet, who was said to have had possession of 3330 drawings. Bourjet was identified

in the documents as having been involved in the disk pack component industry for a number of years as a manufacturer and salesman.

Bourjet, the affidavit said, recontacted Philip J. Steckel, from whom he had bought 3330 plans in 1971 and early this year held a series of meetings with him.

Steckel, a retired IBM buyer, was said to have agreed to sell a complete set of the 3340 project drawings for \$50,000 plus \$50,000 for his own efforts.

Steckel also offered drawings of the 2314 disk drive for \$50,000, the affidavit alleged.

Detective Frechette told of plans by Ramon Serrata, an IBM engineer, to purchase and use miniature cameras to photograph 300 of the 3340 documents.

The affidavit also claimed Steckel and Adolf Jarmann, also one of the alleged conspirators and a former IBM engineer, were getting 10% and 20% respectively, for each carriage assembly made at K&K Manufacturing Inc., in Campbell, Calif.

The company made a carriage assembly said to be identical to the 2314, of which Steckel and Jarmann had copies, the affidavit said.

There were also extensive descriptions in the affidavit of attempts by various persons to sell drawings identical with those of the 3336 disk pack to firms such as Caelus, Honeywell, Nashua and RCA.

Other sales attempts were allegedly made to BSF, Computest, CDC, Honeywell, 3M and Memorex.

Study Estimates Market

French Trend Toward Large CPUs

PARIS — The DP industry is expected to benefit from France's sustained economic growth and anticipated boom, according to a recent *EDP Europa Report*.

CPU purchases in France are increasingly in the medium- to large-scale size, whereas the UK and Germany are showing trends toward small systems, the report observed.

Currently, France and the UK are vying for second place to Germany in the number of CPU installations. France has 7,602, the UK has 7,441 and there are 8,225 in Germany.

One reason suggested for the market growth in the area of medium to large computers is the historical weakness of data transmission facilities.

The report noted that although efforts are being made to catch up in the transmission area "there must still be some feeling amongst users that in buying a small system they are buying a stand-alone unit capable of performing a limited number of tasks."

In the UK and Germany, by contrast, "there is a feeling that, while networks are not yet a general part of the DP scene, there are increasing possibilities for using data transmission and bureau facilities, and thus the purchase of a small system with communications potential may be seen as a more viable investment."

While in 1971 there were 3,960 small computers costing between \$60,000 and \$300,000, in 1975 this figure is expected to reach 7,480. The medium-scale market, for units costing between \$300,000 and \$1.7 million, is expected to grow from 1,798 units in 1971 to 2,060 units in 1975.

The report forecasts the number of large CPUs in France will triple between 1971 and 1975. For units costing over \$1.7 million, there were 220 installed as of 1971, and 630 units are expected by 1975.

In France, the total number of installations, including very small units, is expected to grow from 6,741 in 1971 to 13,290 in 1975.

A comparison of annual expenditures indicates the peripherals market will almost triple in each of the three countries.

West Germany spent \$635 million on peripherals in 1970, and is expected to spend \$1.8 billion in 1975. In France, the expenditures are expected to range from \$472.9 million in 1970 to \$1.39 billion in 1975.

In 1970 in the UK, \$553.3 million was spent on peripherals, and \$1.35 billion is the figure anticipated for 1975.

Classified as peripherals are: input, "acquisition equipment, printers, central memory, disks, tapes and terminals."

Wema Names Officers

CW West Coast Bureau

PALO ALTO, Calif. — Alan J. Grant, executive vice-president of Aerojet-General Corp., has been elected to the new office of board chairman of the Western Electronics Manufacturers Association.

E.E. Ferrey, who has headed the association staff as executive vice-president, was elected by the board of directors as Wema president and chief executive officer.

The realignment of the management structure was part of an expansion plan conforming with newly adopted by-laws specifying that the top elected official from industry will be chairman of the 35-man policy-making board rather than association president.

Wema directors this month expanded the eligibility qualifications for associates to admit organizations that are responsible for research and development operations affiliated with universities or government agencies.

By Toni Wiseman
Of the CW Staff

BOLTON LANDING, N.Y. — The banking industry is abundantly capable of assuming leadership in the emerging era of electronic funds transfer, according to Grover W. Ensley, executive vice-president of the National Association of Mutual Savings Banks.

More than 90% of the nation's mutual savings banks are already computerized and on-line, he observed.

He compared these statistics with those of commercial banks, which are less than 20% on-line, and the savings and loan industry which is about 40% on-line.

Must Move Aggressively

"As an industry, we must move aggressively into a position of commanding capability in the transfer of funds business," said Ensley. He went on to note that it was with this goal in mind that the Mutual Institutions National Transfer System (Mints) was organized last July.

Governor Bucher of the Federal Reserve Board, he said, has pointed out that the rising cost of handling paper checks, together with the likelihood that interest will be paid on checking accounts in the future, will hasten the switch to electronics transfers.

As the charge for providing checking services rises, Bucher stated, public resistance to electronic funds transfers can be

expected to be replaced by public pressure to bring about such change quicker than had been expected.

Mints is an independent affiliate of the National Association of Mutual Savings Banks, formed "to provide a central facility in aid of savings institutions in planning and implementing transfers of funds," said Ensley, who is vice-chairman of Mints.

ICL, Nixdorf Set Marketing Pact

LONDON — After lengthy talks, International Computers Ltd. (ICL) and Nixdorf have taken what might be a first step toward closer cooperation with an agreement covering marketing of a Nixdorf cash receipt terminal system.

Under the agreement ICL will market the terminal in the UK, which provides Nixdorf with access to the government market and gives ICL a machine to fill a gap in its product line.

IBM recently made the first UK install-

ment of its cash receipt terminal.

The Nixdorf unit can be linked to both ICL 1900 series and System 4 computers.

Talks are reportedly continuing between the two firms on a possible link up for the development of a small computer for the low end of ICL's new range.

The British government seems to be endorsing the idea of commercially viable agreements between firms of different nations. "It is the government's view that cooperation with other European computer companies, on the right commercial terms, is desirable," observed Anthony Grant, undersecretary at the Department of Trade and Industry.

"If ICL decides that there are prospects for a worthwhile association with Nixdorf, the government will do what they appropriately can to facilitate it."

Data 100 to Expand Mini Operations by Acquisition

MINNEAPOLIS, Minn. — Data 100 Corp. plans to expand its minicomputer operations with the proposed acquisition of California Data Processors, Santa Ana, Calif.

The agreement calls for Data 100 to acquire the assets of the California firm and a license to market its technology.

The acquisition will bring additional technology to Data 100 and provide it with a minicomputer product line which has broad market application, according to Edward D. Orenstein, president of Data 100.

The price was not disclosed. The acquisition is subject to certain conditions and is expected to be completed by July 1. The California firm will operate as a wholly owned subsidiary, with Fred B. Cox remaining as chairman.

Contracts

Univac has been awarded a contract by the U.S. Department of Transportation for three computer systems to be built around the Univac 1616. The units will be used in support of the Urban Rail Technology Program of the Department's Urban Mass Transportation Administration.

Chilton Corp. has signed a service agreement with the Credit Bureaus of Shreveport, La., and Richmond, Va., to automate the bureaus, train personnel and provide all necessary data processing services.

Culler/Harrison, Inc. has received a contract from the Advanced Research Projects Agency for its advanced signal processing system, Signal/I, and for research and development in speech compression for digital voice transmission.

Optical Recognition Systems has signed a contract with Hewlett-Packard for Model 7970 tape transports and series 7900 disk drives.

SCM Corp.'s Kleinschmidt Division has received an order from M&M Computer Industries Inc., a subsidiary of the Singer Co., for Model 7360 line printers.

The American Society for Information Science has been awarded a contract by the National Institute of Education to operate the Eric Clearinghouse on Library and Information Sciences.

From AUERBACH... Books that help you Plan and Control Data Processing

1. COMPUTERS: Auditing and Control

Elise G. Jancura, CPA, and Arnold H. Berger

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Prevent computer assisted fraud from seeping into your business. This book covers controlling, verifying and evaluating the results of computerized functions with emphasis on methods of effective auditing to improve the credibility of computer produced information. Cost control, application development, equipment utilization, system design, standards, documentation and more are covered to fit the needs of accountants, controllers and DP managers.

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2. COMPUTER CONTROL GUIDELINES

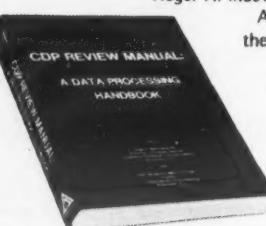
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3. CDP REVIEW MANUAL - A Data Processing Handbook

Roger A. MacGowan and Reid Henderson



A comprehensive review for the CDP exam. 537 Q's & A's encompass all major DP subject areas: equipment, programming and software, DP management, accounting, mathematics, statistics, and systems analysis and design. P225 / \$12.50

4. TECHNIQUES FOR DIRECT ACCESS

Keith London

A much needed reference that introduces you to all aspects of direct access devices and their uses. Hardware characteristics and basic software approaches are described. Devices treated are those most widely marketed and those with the best performance. It also considers theory and fundamentals of file design, with specific discussion of sequential and random storage and access. Specialized file structures, file security and control, programming and general software are also covered. P206 / \$14.95

5. MODULAR PROGRAMMING

Jeff Maynard

Covers economic and other advantages of the use of modular programming in data processing. First it describes the theory of modular programming, then it shows you how to apply practical considerations to the actual working of the system. Covers program production, methodology of modularization, and a simple system of conversion for any program specification.

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6. THEORETICAL ANALYSIS OF INFORMATION SYSTEMS, 4th Edition

Borje Langefors

This book describes the analysis and design of information systems from both the analytical and theoretical viewpoint. It covers not only management information systems but other applications as well. Primary emphasis is on basic principles of analysis in practical systems work and theoretical research.

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7. AUERBACH ON SMALL BUSINESS COMPUTERS

Explains the criteria for assessing the merit of computer usage in a small business environment. Also less costly approaches to data processing when a SBC is not needed. Everything you need to know to take advantage of SBC's.

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8. AUERBACH ON TIME SHARING, Revised Edition

A valuable reference for the present and prospective user of a time sharing service, this book aids the choice of a service based on the best information available. It surveys current technology, describes equipment and associated languages, specifies benchmarks for evaluation of a time sharing service.

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Post Office First Benchmarked Units, Then Awarded Entry Systems Contract

DALLAS — In a departure from some other federal agency procurements, the U.S. Postal Service ran benchmarks on data entry systems before letting a two year lease contract for systems in six cities.

Although he might be considered somewhat partial as his firm was awarded the contract valued at \$1.2 million, Dallas Talley, marketing vice-president of General Computer Systems Inc. (GCS), likes the idea of benchmarking before letting the contract, instead of afterward.

Through the use of the benchmark, he pointed out, the Postal Service was able to determine the total cost of operating the system, considering operator and station throughput instead of simply monthly station cost.

The Postal Service conducted a 48 hour benchmark using Post Office production work at sites designated by the vendors.

The operators were supplied by the vendors, under supervision of a Postal Service technical representative.

Actually, the procurement procedure started

about the summer of 1971, when the Postal Service issued hardware and software specifications for installment of a pilot system in St. Louis.

General Computer Systems was chosen, a system was installed in about January 1972.

A year later, the Post Office issued detailed specifications for hardware and software, and asked vendors to undergo the two day benchmark.

In evaluating the benchmarks, the Post Office could determine by vendor the number of stations needed, the total system capability and the hardware cost. The contract was let last week.

GCS is to have 129 of its 2,100 systems operational by Sept. 1.

Talley noted that the GCS bid was based on list price.

He said the specifications over the two years changed perhaps 20%, "which is quite low considering the changes in the input technology." The software and applications software specifications were "very detailed because of the pilot study," he observed.

Siemens to Continue Computest Products

CHERRY HILL, N.J. — Siemens Corp. has established manufacturing quarters in the U.S. with the acquisition of Computest Corp. for \$4.9 million in cash.

The German firm plans to produce Computest's automated test equipment under the Computest name, "for at least the foreseeable future," a Siemens spokesman said.

Most of Computest's products are marketed to manufacturers of computer equipment, he observed.

"Where compatible, we probably would bring" some of the Siemens equipment produced abroad "into the plant to be produced for marketing by Siemens in the U.S." he added.

Trivex Buys Memorex 1250s

COSTA MESA, Calif. — Trivex, Inc. has ordered approximately 150 Memorex 1250 communications terminals for hard-copy printouts of data displayed on Trivex 40/80 CRT terminal systems.

Memorex began shipment of the terminals in May.

Executive Corner

■ George S. McLaughlin Jr. has been elected president of Summit Computer Corp., Summit, N.J., a used computer lessor/dealer. McLaughlin will also continue his duties as treasurer of the firm.

■ Lloyd Olson has joined Lencor International as vice-president, finance. Olson previously held management posts with Technicolor, Inc.'s Commercial and Educational Division, and Ernst & Ernst.

■ Thaddeus J. Lubas has been elected vice-president, finance, of Data Processing Security, Inc. Lubas has served in various management positions with Montgomery Ward & Co. for 15 years.

■ Consolidated Computer, Inc., announced five new executive appointments in the company: John E. Kleins, vice-president, corporate development; Geoffrey H. Bennett, vice-president, marketing and finance; Albert C. Couillard, vice-president, manufacturing; Brian J. Dunk, vice-president, product development; and William Kooij, vice-president, advanced planning.

■ Daniel C. Durand, formerly vice-president, manufacturing, for Memory Technology, Inc., has been named to the newly created position of vice-president, operations.

■ Jan Hjelm has been elected vice-president, marketing, for Digital Computer Controls. He was formerly national sales manager for Sweda.

"Three hundred men in the Carolinas are selling CFI disk packs for us. They're our customers."

"Actually, our customers sell more for us than we do," says Carlton Chandler of Carlton Chandler & Associates. "The high degree of service and personal concern we show are the reasons they get the word out for us."

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Personal profiles

Carlton Chandler (left) and John Efird, partners in Carlton Chandler & Associates, Greenville, S.C. Active members of DPMA. Fifteen years experience. Family men who are active in their community

around the clock to get answers for our customers."

Carlton Chandler and John Efird, professionals who have devoted their entire careers to data processing, are typical of the 186 representatives serving

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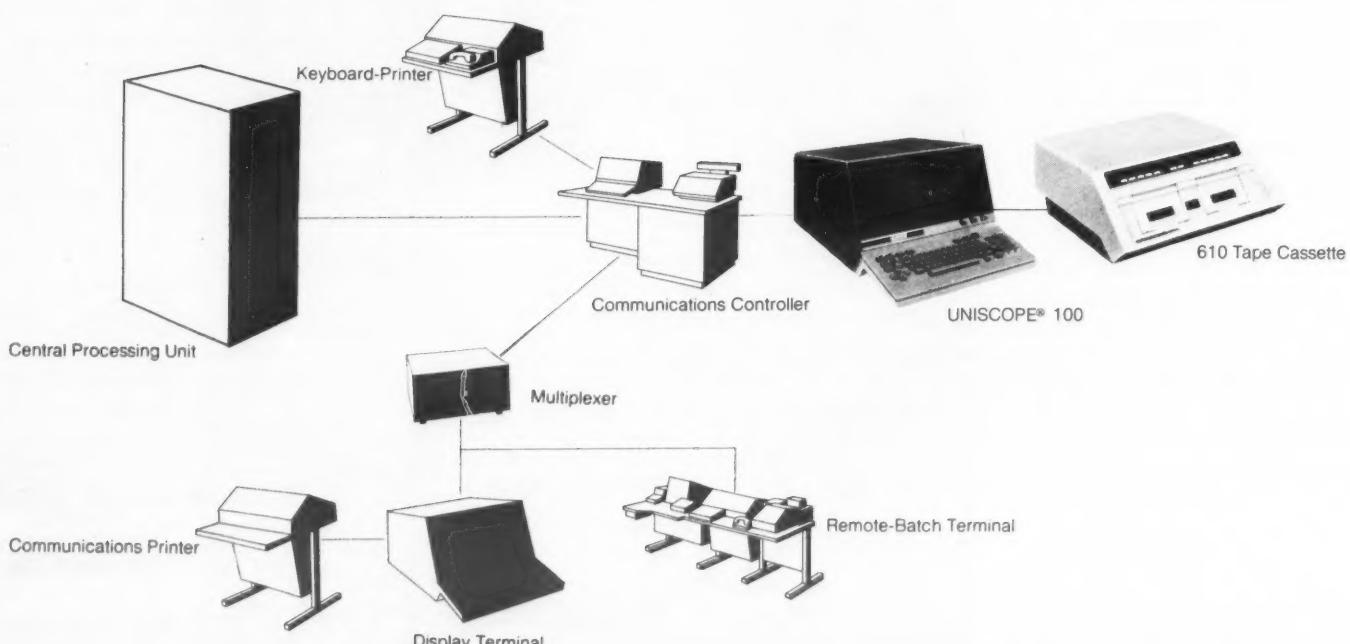
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As Well as End User**Data Recall Shifts to OEM Core**

LOS ANGELES — Data Recall Corp. is planning to diversify into the OEM core memory markets, according to Roy H. Norman, the firm's new president.

"It is more in line with our corporate objectives to diversify our product line and increase our customer base rather than rely on IBM and Univac end users only," he commented.

"We are aiming at a 50-50 split between

West Coast Happenings**Compro Uses Print Device In Terminal, Sells OEM**

CW West Coast Bureau

COSTA MESA, Calif. — Compro Corp. has acquired exclusive rights to manufacture, market and license a new 30 char./sec print mechanism.

Frederick B. Scholnick, president of Compro, said the new printheads contain only three moving parts and are available in Compro terminals as well as for OEM applications.

Field replaceable fonts are available for any type style or size, special characters and symbols and non-English alphabets, he said. The unit can produce multiple copies.

Compro terminals available with the new print mechanism include the Comproport 1030 and the Compro 6000.

The 1030 is a portable unit with 80 column, 64- or 96-char. font, with keyboard, acoustic coupler and optional magnetic tape in a carrying case designed to meet airline carry-on requirements.

Print speed is selectable at 10, 15- and 30 char./sec. The price is about \$2,900.

The 6000 is a 96-char., 132-column terminal with a full Ascii keyboard, acoustic coupler, optional magnetic tape and optional high-speed modems and will cost about \$5,000.

The printers will be in production in 30 days. Deliveries will be in 30 to 45 days after production starts. The firm is located at 3001 Red Hill Ave., 92626.

Terminal to Travel

SAN FRANCISCO — Computer Firmware Systems, Inc., a systems house, has disclosed plans to introduce a briefcase-size data entry device with a microcomputer.

Priced at \$2,000 to \$5,000, it could be used by a salesman to transmit information such as his daily transactions to a central computer.

The product will reach the market in about a year, he said.

Diablo Systems Expand

HAYWARD, Calif. — Diablo Systems Inc. has added an additional 41,000 square feet to its main manufacturing plant and added 125 persons to its payrolls. Currently the peripherals maker occupies 110,000 square feet and has 450 employees.

Standard Logic Signs NOAA Deal

SANTA ANA, Calif. — Standard Logic Systems Inc. has been named prime contractor by the National Oceanographic and Atmospheric Administration (NOAA) to build a man-machine interactive processing system.

The unit will bring photos from satellites to a computer where they will be preprocessed and then displayed.

Nixdorf Plans Aussie Unit

Special to Computerworld

SYDNEY, Australia — Nixdorf Computer Co. is planning to spend \$28 million to establish a computer rental company in Australia.

The rental service as distinct from leasing would be the first of its kind in Australia and is aimed at strengthening the company's existing operations.

Peter Ehrlich, a director of Nixdorf, said the company would probably establish a repair center here next year.

Products Involved

The diversification will involve Data Recall's ferrite stack, array and memory systems, which until now have been marketed only to IBM and Univac users.

Data Recall was the initial company involved in a memory industry dispute with IBM last year over maintenance. It was subsequently resolved when IBM agreed to maintain peripheral computer equipment on a best efforts basis.

Norman said the firm anticipates a net loss for the year ended June 30 because of a writedown of inventory. It would be the company's first red ink.

The company is expected to be profitable in the first quarter next year, he added.

Orders & Installations

First National Bank of Seattle has ordered a GCS 2100 source data entry system from General Computer Systems, Inc.

Odessa College, Texas, has ordered a Univac 9480 system for administrative, student education, and accounting applications.

Mobil Oil has ordered an Input 80 Model C page-reading system from Recognition Equipment for use in processing communications from New York to locations around the world.

System 99, a California-based motor carrier company, has installed a Telecontroller communications processor manufactured by Action Communications Systems, Inc.

The U.S. Navy's Audit Services has installed a Cars 2 audit reporter system from Computer Audit Systems, Inc., for use in conjunction with its Burroughs 6700.

Tarrant Savings Association, Fort Worth, has ordered a Univac 9400.

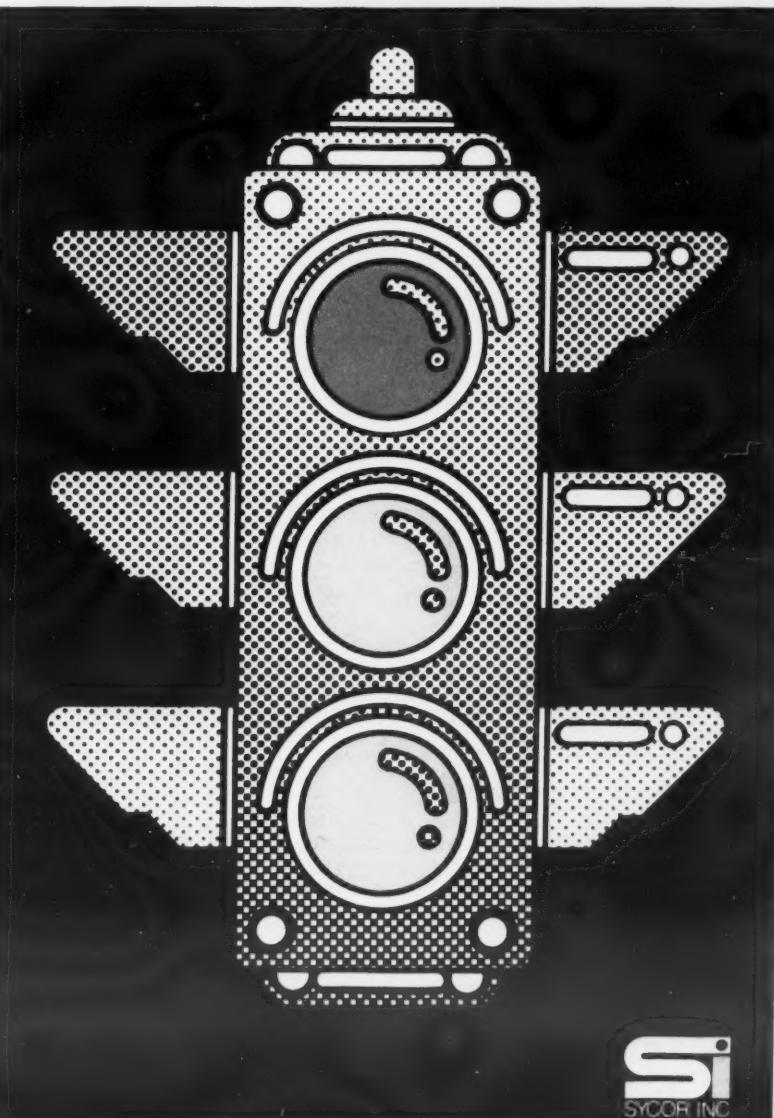
Lundy Thegard Oil Co. has ordered a Varian Data Machines 73 for use in research and development.

Guy Gannett Publishing Co. of Portland, Maine, has installed an NCR Century 50 to process payrolls and do general ledger accounting. The system will later be used for monitoring circulation and advertising.

Robert Hall Village, New Orleans, has installed a Pitney Bowes-Alpex Spice electronic register system.

St. Cloud State College, Minnesota, has ordered a Univac 1106 to handle administrative applications.

The Department of Finance, State of Ohio, has ordered a Univac 1106 multiprocessor system to serve the Bureau of Motor Vehicles and the State Highway Patrol.

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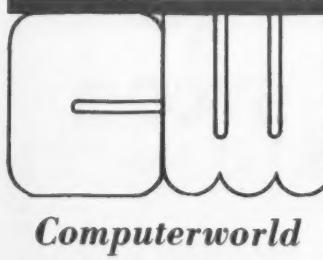
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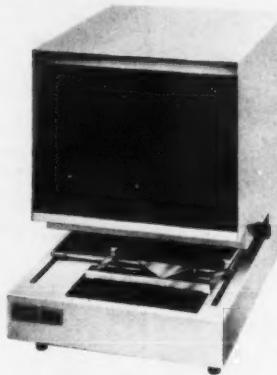
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Toward the Bottom Line...

IBM declared a quarterly dividend of \$1.12 a share payable Sept. 10 to holders of record Aug. 14. The dividend, the first since the recent 5 for 4 stock split, is equivalent to the presplit rate of \$1.40 a share.

\$\$\$

Directors of Bunker-Ramo have approved purchase of up to one million shares of the company's common.

\$\$\$

Signetics has withdrawn its proposed public offering of 715,000 shares of common.

\$\$\$

Fairchild Camera & Instrument has established a two-year, \$33 million line of international and domestic credit, which replaces a previous \$25 million domestic line.

\$\$\$

Tycom, formerly Terminal Equipment Corp., saw second quarter earnings rise to \$112,436 including placement of a \$400,000 debenture, compared with a loss of \$118,464 in the year-before period. The rise was directly related to contracts with Savin Business Machines and Litton Industries, according to President Eugene Starr.

\$\$\$

Data General Earnings, Revenues Rise in 3d Period, Nine Months

SOUTHBORO, Mass. — Earnings and revenues were up during the third quarter and nine months at Data General Corp.

In the quarter earnings rose to \$1.6 million or 20 cents a share from a restated \$901,000 or 11 cents a share in the same period a year ago. Figures were restated to reflect a pooling of interests.

Revenues climbed to \$12.9

million from \$7.3 million in the third quarter of 1972.

For the nine months the picture was even more dramatic, with earnings totaling almost \$4.3 million or 52 cents a share compared with almost \$2.3 million or 28 cents a share.

Sales during the period reached \$33.9 million compared with almost \$19 million in the previous year's period.

NCSS Continues to Set Records

NORWALK, Conn. — National CSS, Inc. reported its eleventh consecutive quarter of record operating revenues and earnings for the quarter ended May 31.

Revenues totaled \$5.3 million, a 40% rise over the \$3.8 million for the similar period last year.

Earnings, including a \$52,000 special credit, totaled \$387,284

or 35 cents a share compared with \$281,464 or 26 cents a share in the year-ago period, which included a \$128,603 special credit.

The firm has installed its seventh computer system in Stamford, Conn., and has established a sales office in Atlanta, Ga.

AMS Expecting Third Quarter Loss

SUNNYVALE, Calif. — Advanced Memory Systems Inc. is expecting a third quarter operating loss of about \$376,000, but the fourth period, reflecting cutbacks made in staff and purchasing changes, is expected to be profitable, President Robert H.F. Lloyd said.

The third quarter was hurt by "a rapid buildup in employment and inventory" to handle the maximum contractual volume under agreements with Intel Corp., Control Data Corp., and Telex Computer Products, Inc., he said.

However, second-half volumes

to these firms are expected to be \$12 million instead of the originally anticipated \$18 million, he added.

Data Trends Cited

PARSIPPANY, N.J. — Data Trends Inc. has "adapted its accounting treatment" following charges by the Securities and Exchange Commission that its accounting procedures were inconsistent with its publicly disclosed accounting policy.

The SEC said the firm had treated certain research and development costs as assets.

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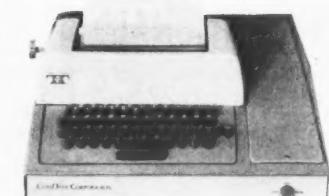


MODEL 150A2-11A
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\$147



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\$1535 \$53/month*

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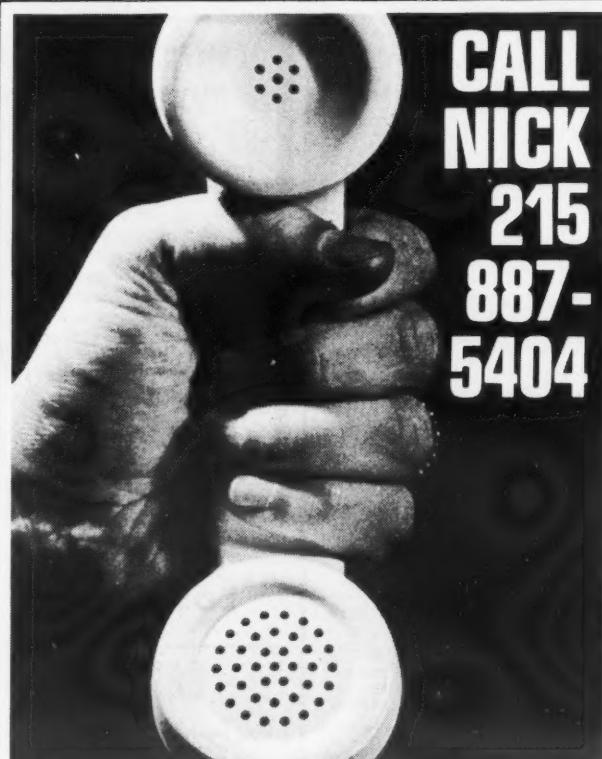
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Earnings Reports

PERTEC		Revenue	1,371,768	1,018,634
Three Months Ended March 30		Disc Op	(37,475)	
Shr Ernd	1973	1972		\$12
Revenue	7,521,000	5,116,000		
Earnings	435,000	379,000		
9 Mo Shr	.35	.50		
Revenue	19,442,000	16,830,000		
Spec Chg	d80,000			
Earnings	1,082,000	1,553,000		
d-Expenses in connection with proxy contest.				
AGS COMPUTERS		Revenue	1,371,768	1,018,634
Year Ended Dec. 31		Disc Op	(37,475)	
Shr Ernd	1972	1971		\$0.02
Revenue	5,213,717	2,656,511		
Earnings	789,084	61,352		

XIOX INTERNATIONAL		Revenue	1,371,768	1,018,634
Three Months Ended Jan. 31		Disc Op	(37,475)	
Shr Ernd	1973	1972		\$0.06
Revenue	434,458	178,953		
Earnings	37,904	(5,710)		

REMOTE COMPUTING		Revenue	1,371,768	1,018,634
Nine Months Ended Jan. 31		Disc Op	(37,475)	
Shr Ernd	1973	1972		\$0.74
Revenue	2,273,409	1,659,007		
Earnings	383,272	(88,354)		

BUNKER RAMO		Revenue	1,371,768	1,018,634
Three Months Ended March 31		Disc Op	(37,475)	
Shr Ernd	1973	1972		\$0.32
Revenue	64,000,000	61,000,000		
Earnings	2,700,000	2,500,000		

a-Adjusted for a one-for-three reverse stock split effective April 24.

DATA MANAGEMENT		Revenue	1,371,768	1,018,634
Six Months Ended Feb. 28		Disc Op	(37,475)	
Shr Ernd	1973	1972		\$0.29
Revenue	260,541	298,175		
Loss	19,419	44,547		

I.O.A. DATA		Revenue	1,371,768	1,018,634
Six Months Ended March 31		Disc Op	(37,475)	
Shr Ernd	1973	1972		\$0.09
Revenue	2,257,764	1,690,259		
Earnings	71,959	10,889		

COMTRON		Revenue	1,371,768	1,018,634
Three Months Ended March 31		Disc Op	(37,475)	
Shr Ernd	1973	1972		\$0.03
Revenue	207,453	171,378		
Earnings	19,011	14,686		
9 Mo Shr	.10	.03		
Revenue	685,998	461,173		
Earnings	58,291	19,153		

SYSTEMS ENGINEERING LABORATORIES		Revenue	1,371,768	1,018,634
Nine Months Ended March 30		Disc Op	(37,475)	
Shr Ernd	1973	1972		\$0.30
Revenue	12,103,000	10,940,000		
aSpec Cred	439,000	319,000		
Earnings	771,000	898,000		

a-in 1973, from sale and lease of properties and tax credit; in 1972, from tax-loss carryforward.

TALLY		Revenue	1,371,768	1,018,634
Three Months Ended April 1		Disc Op	(37,475)	
Shr Ernd	1973	1972		\$0.35
Revenue	\$3,098,662	\$2,791,034		
Loss	335,175	222,022		

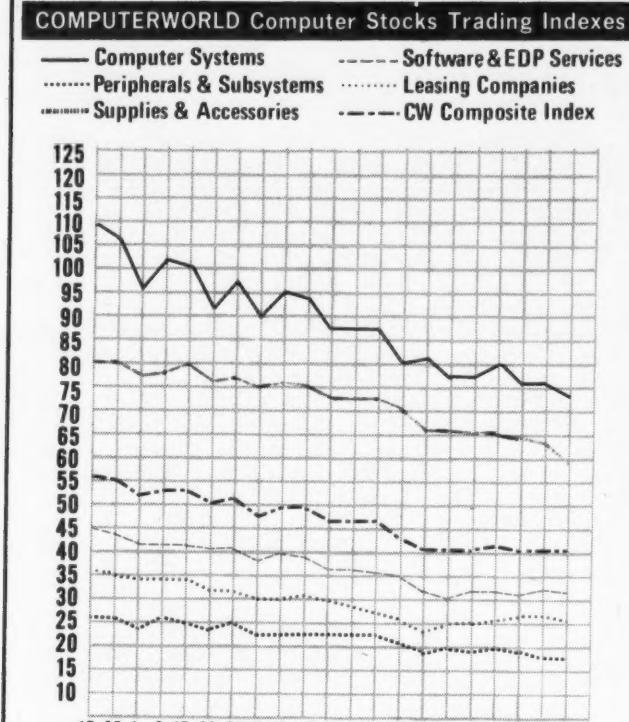
DATATYPE		Revenue	1,371,768	1,018,634
Year Ended Dec. 31		Disc Op	(37,475)	
Shr Ernd	1972	1971		\$0.00
Revenue	\$728,088	\$495,124		
Loss	799,229	898,910		

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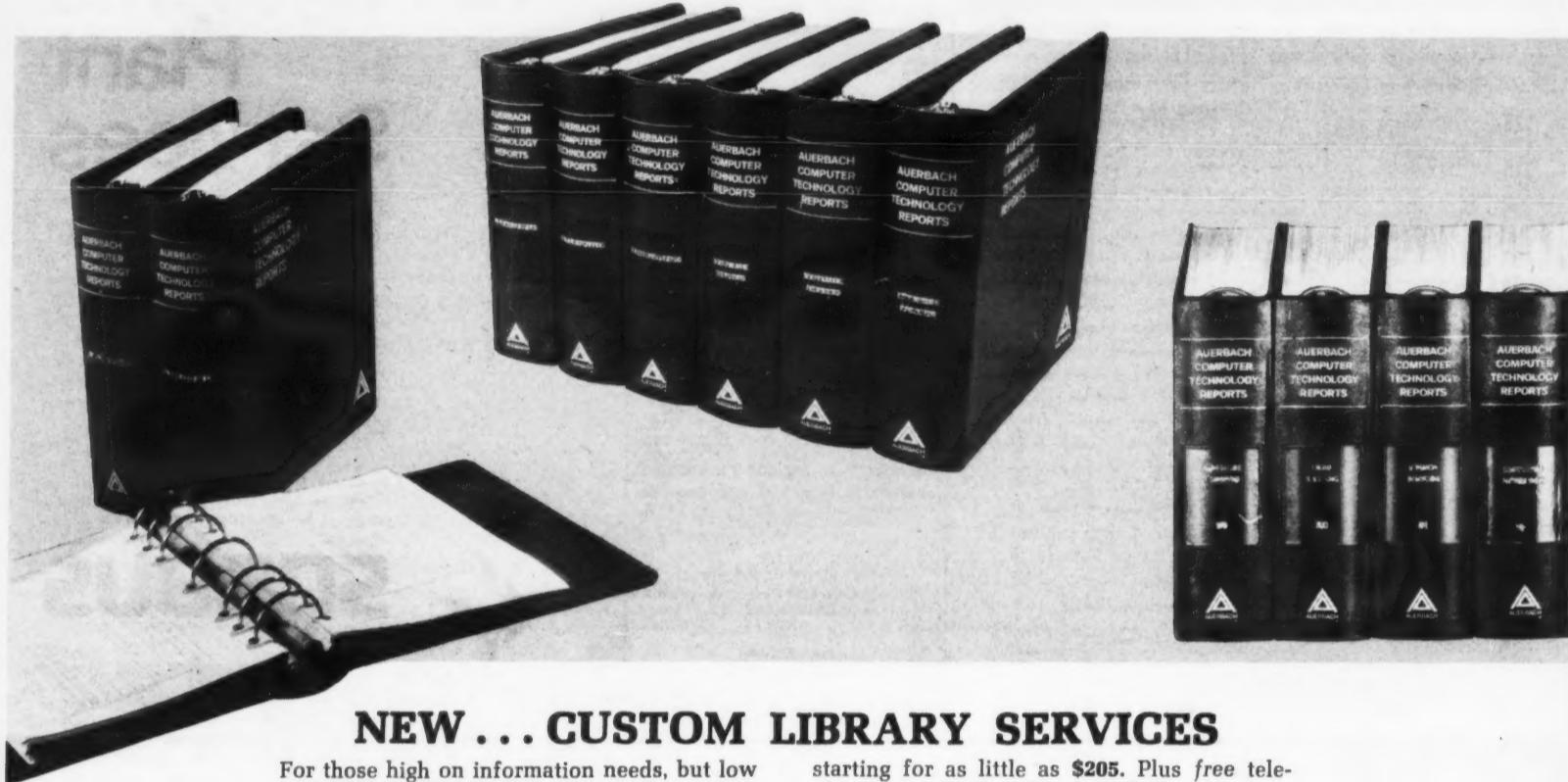
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SOFTWARE & EDP SERVICES		Revenue	1,371,768	1,018,634	
Ex	C	1973 Range	July 6	Week	
Ch	H	(1)	1973	Chnge	
N	O	ADVANCED COMP TECH	1- 2	1 1/2	+ 3/8 +33.3
A	A	APPLIED DATA RES.	2- 4	1 3/4	- 1/4 -12.5
O	O	APPLIED LOGIC	1- 3	1 1/4	- 1/4 -16.6
N	N	AUTOMATIC DATA PROC	41- 54	40 3/4	- 4/4 -9.4
O	O	BRANDON APPLIED SYST	1- 1	1/4	- 1/4 -50.0
O	O	CENTRAL DATA SYSTEMS	8- 9	7 1/2	0
O	O	COMPUTER DIMENSIONS	2- 5	2 3/4	- 1/4 -8.3
O	O	COMPUTER DYNAMICS	1- 2	5/8	0
O	O	COMPUTER HORIZONS	1- 6	1 1/2	+ 1/4 +20.0
O	O	COMPUTER NETWORK	1- 5		

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